IRON TRADE REVIEW

Registered U. S. Patent Office

The Authority of Industry *National and International*

Vol. LXXIV Cleveland, January 3, 1924 *No. 1*

What's The Matter With Business?

BY C. J. STARK

HAT'S the matter with business? This question has been asked frequently, at times plaintively, during the past year. Many of those engaged in productive enterprise have been puzzled by their failure to realize accustomed results in sales volume but moreso in profits commensurate with a large turnover. Consequently they have come to a state of mind where they are disputing their own figures as to whether the year 1923 actually was a period of true prosperity. Furthermore, reasoning from their experience, they look upon the future with doubt and misgivings.

What is real prosperity? This has been defined as a state where labor and capital are well employed at rates of return to both that permit a reasonable margin of savings but which do not encroach unduly upon the interests of the third party in the sales and production triangle, the general public. In other words, prosperity means a condition of common well-doing.

Applying this test, 1923 has scored well as a period of genuine prosperity. Production has been record-breaking, consumption equally so as registered by the unprecedented volume of railroad traffic. Purchasing power has been large. Prices have not been oppressive. Savings have been astounding.

If its balance sheet in 1923 has not been satisfactory, business must look to itself for the explanation. Has it made the most of its opportunities? Has it been efficient, aggressive, farsighted? Has it modified its perspective to changing conditions?

A new era is opening to industry and productive enterprise. Capacity has been tremendously expanded in recent years. In some lines clearly it has out-stripped normal demand. Competition is reasserting itself, keener, more vital, more exacting than ever before. The long trend of prices unmistakably seems to point downward with narrowing margins of profit. To meet this situation, banishment of waste, greater efficiency in production, higher standards of quality, better management, all are demanded. For those who can survive the test the rewards will be even more alluring.

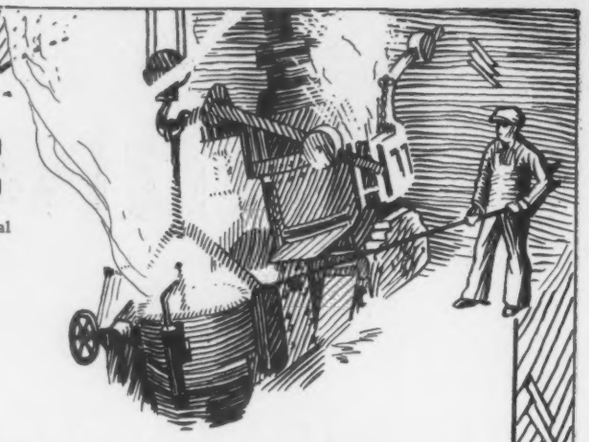
The play of these new forces of business in 1924 will determine where success will be found.

IRON TRADE REVIEW

Registered U. S. Patent Office

The Authority of Industry National and International
Published Every Thursday by
THE PENTON PUBLISHING CO., CLEVELAND, O.

January 3, 1924



Contents

Annual Statistical Number—The Year Book of Industry

FEATURE ARTICLES

What's the Matter with Business?—*By C. J. Stark* 1
Has Our Industrial Capacity Been Overbuilt?—*By A. O. Backert* 3
Finding Work for Idle Equipment—*By E. L. Shaner* 7
Railroad Consumption Is Amazing—*By E. C. Kreutzberg* 11
Engineering Progress in 1923 Is Marked 17
Ironmakers Break Production Records—*By Ralph Hayes Sweetser* 18
Interest Centers on Rolling Practice 19
Foundry Standards Advanced in 1923—*By H. E. Diller* 21
Research on Refractories Is Progressing—*By Robert E. Ferguson* 22
Seek Standardization in Crane Design—*By Leonard P. Egan* 23
Machinery Builders Improve Products—*By E. F. Ross* 31
Applications of Pressed Steel Increase—*By W. W. Galbreath* 33
Welding Is Employed on Broader Basis—*By James W. Owens* 35
American Industry from the Air 25
Industrial Building Increases—*By Robert T. Mason* 37
Steel Industry Expands on Coast—*By Don Partridge* 40
Progress in Iron Ore Trade Reflects Prosperity—*By A. J. Hain* 45
Increase Mill Capacity in 1923—*By John D. Knox* 50
1923 Conservatism Lays Firm Trade Basis for 1924—*By John W. Hill* 54
The Business Trend 55
Wages Back at Wartime Peak 63
World Output Nearly Pre-War 68
Blocs Block Way at Washington—*By Fred B. Pletcher* 70
Business Bringing Hope to Europe—*By H. Cole Estep* 75

DOMESTIC MARKET REVIEWS

PREPARED BY STAFF REPRESENTATIVES

W. H. Lloyd.....Pittsburgh
E. C. Boehringer.....Chicago
H. R. Simonds.....Boston
E. C. Kreutzberg.....New York
G. F. Creveling.....New York
B. K. Price.....New York

Normal Business Returns in 1923—*By C. J. Stark*.....86

Year's Pig Iron Output Largest..... 89
Coke Ovens Doubled Production Effort. 89
Wire Sales Heavy at Advancing Prices.. 90
Periodical Shortages in Steel Supplies... 90
Rails Featured by Unusual Activity.... 91
Weakness Marks Coke By-Products.... 91
Pipemakers Unable To Meet Demands.. 92
Scrap Market Steady Struggle..... 93
Refractory Output and Prices Steady... 93
Manganese Duty Has Little Effect..... 91
Steel Plate Production Is Large..... 95
Shape Bookings Break All Records..... 95
Heavy Bar Demand Keeps Mills Busy.. 96
Cast Pipe Bought Freely to Capacity... 96
Sheet Buying Heavy, Taxing Capacity.. 97
Record Made in Year's Tin Plate Selling. 97

Market History Told by Prices 99-110

EUROPEAN MARKET REVIEWS

PREPARED BY STAFF REPRESENTATIVES

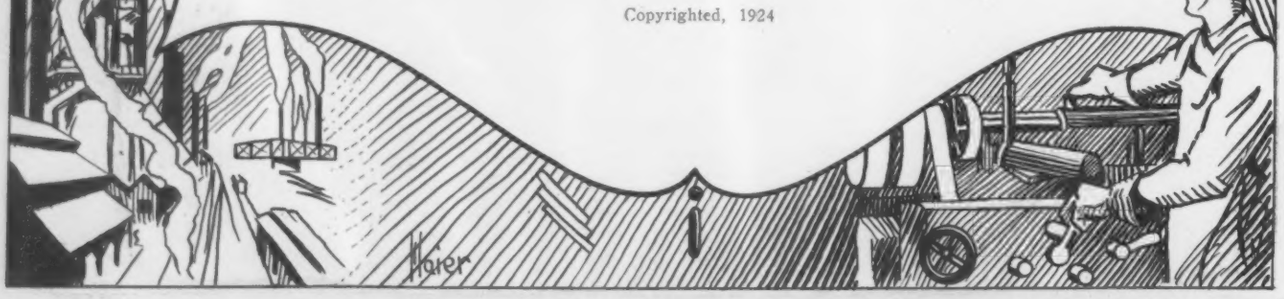
Joseph Horton.....Birmingham
Vincent Delport.....Paris

Europe Reacts to Ruhr Events—*By H. Cole Estep*.....113

British Trade Is More Active..... 114
Belgium Now Showing Marked Gains... 115
French Producers Are Confident..... 117
Paris Controls Germany's Trade..... 119

Pig Iron Output and Current Markets, Prices and News..... 79-84, 120, 122, 124

Copyrighted, 1924



Has Our Industrial Capacity Been Overbuilt?

Large Extensions During War and Since Play Important Part In Determining Engagement of Plant Facilities and Corresponding Prosperity of Individual Companies —1919-1923 Per Capita Production of Pig Iron Less Than 1910-1914—Greater in Steel

BY A. O. BACKERT

MOST of the business ills of 1923 may be attributed to over-production. The excess of marketable supply the past year has been responsible for the unsettled condition in pig iron, in rubber, in the oil industry, in textile goods and other branches of commerce. In fact, it was an over-supply of farm products with relation to the restricted buying capacity of Europe that put the American farmer in the unfortunate position which a large part of the past year has found him.

In point of quantity of all industrial products consumed, 1923 undoubtedly was one of the greatest if not the greatest year in the history of the country if the abnormal war period be excluded. Certainly, it is entitled to be so ranked in iron and steel. Considering the lack of satisfaction that many producers and manufacturers find in the final results of the past year in a business sense, the question logically arises whether or not the country's industrial plant on the whole is not suffering from a case of over-capacity.

Machine Tools Languishing

That this conditions is true in certain lines of manufacture, under the dislocations of trade and commerce resulting from the war, admits scarcely of argument. A plain case is that of machine tools. Plants of this character operated at less than 30 per cent on the average in 1923. Their average activities in the five years succeeding the war probably have not exceeded 40 per cent. Industrial expansion upon which the machine tool builders must depend to take up a large part of their output, was conspicuously limited the past year as it has been for several years. The war with its over-stimulation of the building and equipping of industrial plants has furnished the chief cause for this. Then the large amount of surplus equipment which the sudden ending of the war left in the hands of the government, of various industrial plants and of the builders themselves has been a tremendous factor. Since then the country has been engaged in assimilating and salvaging the outgrowth of this necessarily special expansion for an emergency purpose. Added to this has been the even more sweeping unsettlement occasioned by the war that has prevailed in industry throughout the world, especially in Europe. This has deprived the American machine tool builders of an important part of their foreign market. If the situation were to be judged from the experiences of recent years, it is clear that the present machine tool capacity is excessive, at least in the production of standard equipment.

The other side of the picture as far as the machine tool builders are concerned is the continuing marvellous growth of the automotive industry; the program of extensive rehabilitation upon which the railroads have embarked; and the fact that the normal industrial progress accompanying the constant development of the resources and underlying wealth of the country gradually is being resumed as the demoralization brought about by the war is fading out and its effects are being absorbed. Beyond that, American industry apparently is entering upon an era of sharper competition in which strong impetus will be given to the setting up of more intensive efficiency in production and the wide adoption of labor-saving devices. Already this process is in evidence. In such a movement the replacement of equipment with new and improved mechanical facilities promises to be extensive. The machine tool industry should benefit from this.

Steel Growth

Theoretical Capacity—Ingots and Castings Gross Tons 1913-1923

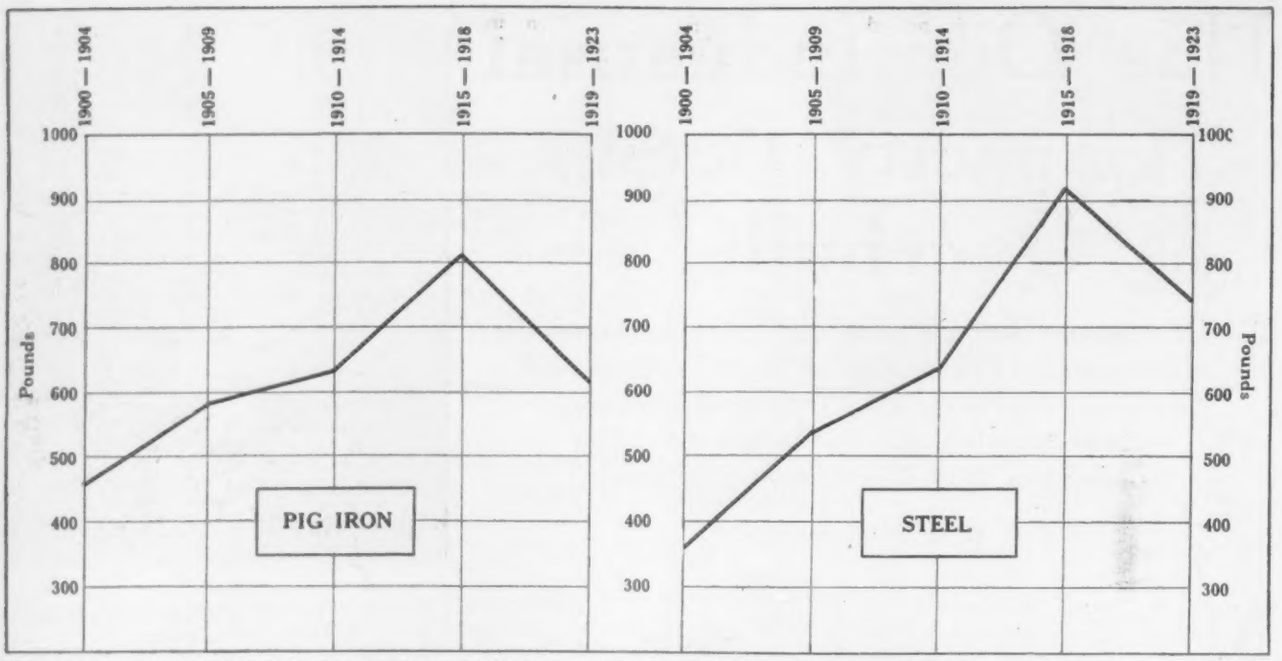
1913	37,915,575
1914	39,523,200
1915	43,822,600
1916	47,585,395
1917	50,454,290
1918	52,348,120
1919	53,193,405
1920	54,801,825
1921	55,817,285
1922	56,060,770
1923*	56,650,000

*Estimated.

Steel Capacity Grows Greatly

In the 10 years from 1913 to 1923 inclusive the theoretical steel capacity of the country including both ingots and castings was increased by 18,145,195 tons or approximately 48 per cent, according to the official statistics. This is at an average of 1,814,000 tons annually. The expansion was from a capacity of 37,915,575 tons in 1913 to 56,060,770 tons in 1922. Of this increase, the war years, as was to be expected, furnished the greater part. In the four years of 1915 to 1918 inclusive, the construction of new steel works or expansions provided an added capacity of 11,824,920 tons. This represented 65.2 per cent of the increase of capacity of the last 10 years. To put it another way, about twice as much new capacity was established in the four main war years as in the remaining six of the past 10 years.

Since 1918, the addition to steel capacity has been moderate, 3,712,650 tons or 7 per cent, representing an aver-



PER CAPITA PRODUCTION OF PIG IRON AND TOTAL STEEL BY RECENT 5-YEAR PERIODS AS COMPARED WITH THE EXPANSION OF THE FOUR WAR YEARS

age of only 530,378 tons annually. This is a relatively small increase for so-called normal times. In the two years of 1913 and 1914 the enlargement of capacity was 5,907,025 tons or 15.5 per cent. Of these two years 1913 enjoyed good business conditions with the consequent stimulation of new construction while 1914 was a depression period. Before 1913, comparable figures of theoretical capacity are not available. However, data of actual production furnish a somewhat analogous picture. From 1894 to 1903 inclusive, production of steel ingots and castings increased from 3,412,032 tons to 13,859,887 tons, or 214 per cent in total, or approximately 944,000 tons annually. From 1904 to 1913 inclusive the gain was from 13,859,887 tons to 31,300,874 tons or 126 per cent in total and about 1,744,000 tons annually. Evidently, the normal growth of the steel industry in the 20 years preceding the outbreak of the war was substantially 15 per cent annually. Had the war not intervened, the steel industry at the end of the great conflict reasonably could have been expected on a normal basis to have been producing about 40,000,000 tons annually. Actually in 1918, it produced 44,461,432 tons.

Per capital production of all steel and pig iron in 1923 was the greatest of any peace year in history. This in itself helps to answer the question whether the past year in reality has been a period of prosperity. The magnitude of operations and of tonnage converted is impressive. The production figures per unit of population were so large that they establish beyond doubt that it was a year of real prosperity so far as consumption is concerned. The per capita production of steel was substantially 883 pounds; in pig iron, it was 821 pounds. In steel this was practically equal to the largest previous year or 1920. In pig iron, 1923 showed the largest figure per individual person by a considerable margin, except in the war years of 1916, 1917 and 1918. It was 44 pounds per capita greater than in 1920 when the previous high water mark of the country for a peace year was established.

Nevertheless pig iron production on an average per capita basis, in the five years of 1919 to 1923 inclusive or 631 pounds was less than the average for the five peace years immediately preceding the war which was 635 pounds. This, no doubt, was due to the extraordinary year of underconsumption of 1921, when the per capita output dropped to 342 pounds. At no time during the past 25 years did production fall to such a low relative point.

Pig Iron Production Per Capita

In Pounds

1900	406	
1901	458	
1902	504	
1903	500	
1904	462	
Total	2,330	Average—466
1905	612	
1906	661	
1907	661	
1908	400	
1909	638	
Total	2,972	Average—595
1910	663	
1911	562	
1912	700	
1913	717	
1914	533	
Total	3,175	Average—635
1915	677	
1916	876	
1917	846	
1918	843	
Total	3,242	Average—811
1919	661	
1920	777	
1921	342	
1922	555	
1923	821	
Total	3,156	Average—631

All [Steel Production Per Capita

In Pounds

1900	300	
1901	375	
1902	422	
1903	402	
1904	335	
Total	1,834	Average—367
1905	533	
1906	611	
1907	599	
1908	353	
1909	592	
Total	2,688	Average—538
1910	634	
1911	565	
1912	736	
1913	725	
1914	509	
Total	3,169	Average—634
1915	724	
1916	959	
1917	987	
1918	961	
Total	3,631	Average—908
1919	834	
1920	884	
1921	415	
1922	715	
1923	883	
Total	3,731	Average—745

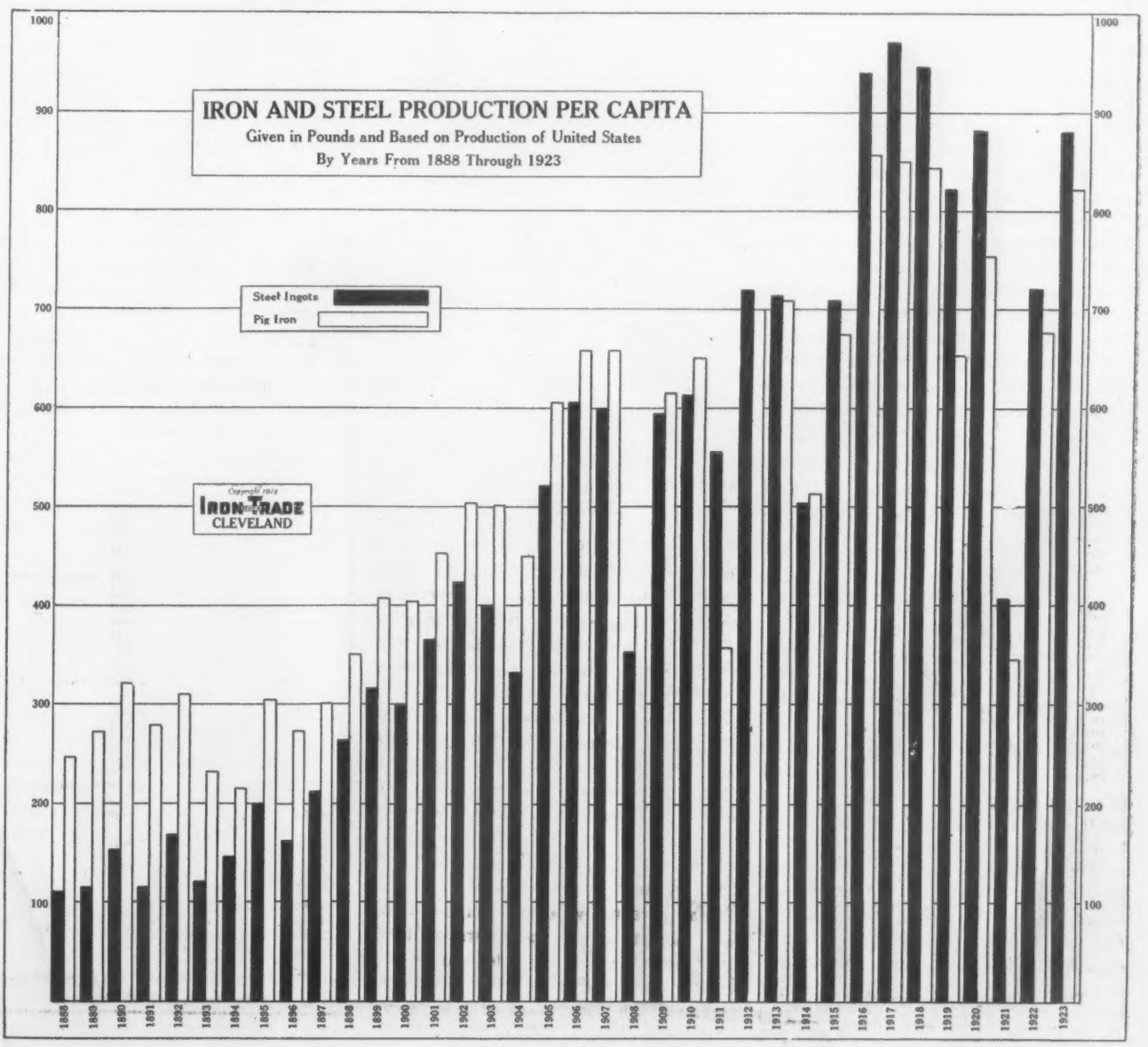
Even in the severe depression period of 1908 it was 400 pounds.

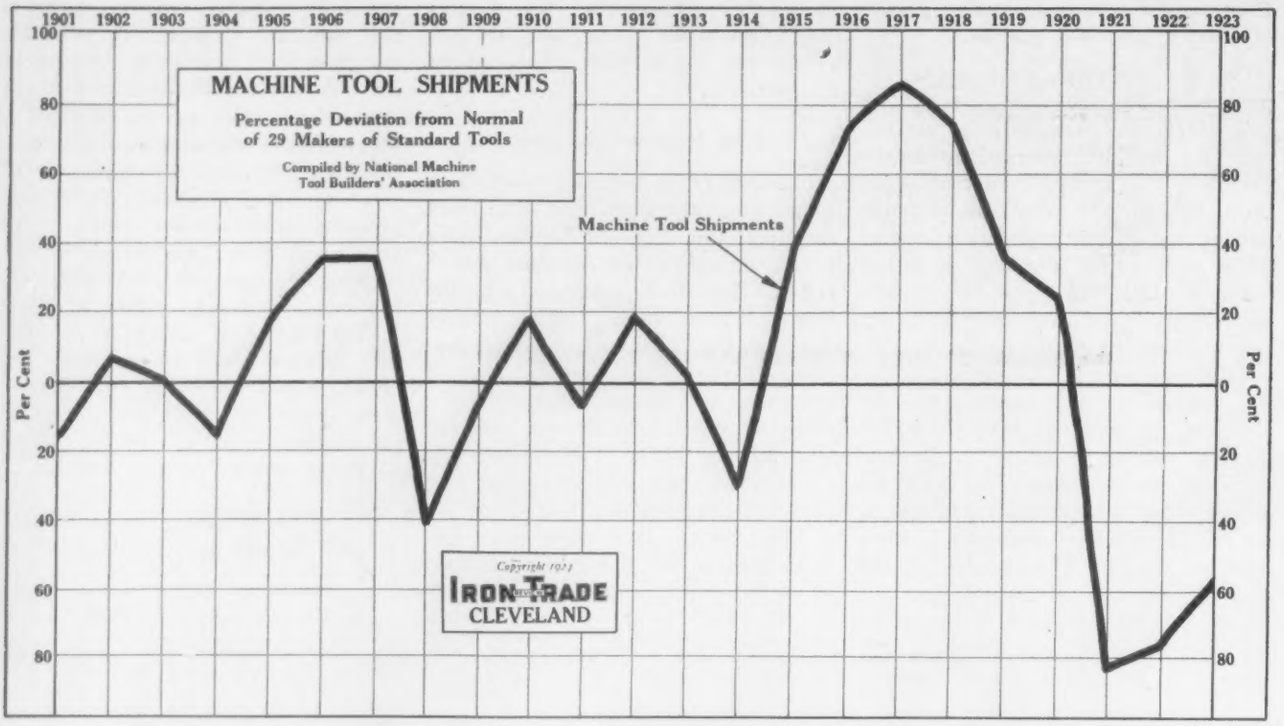
On the contrary, steel production per capita for the five years ended with 1923 was considerably in excess of the five years immediately preceding the war. The averages for these two periods were 746 and 634 pounds respectively. In other words, while steel output per unit of population in 1919-1923 grew 112 pounds or 17.7 per cent over 1910-1914, pig iron declined from 635 to 631 pounds or 0.63 per cent. This probably can be ascribed to the accelerated consumption of steel of presentday life in this country, plus the larger use of scrap in the making of steel, resulting from the increased domination of the open-hearth method of manufacture. Against the five-year period of 1900-1904, steel production per capita in 1919-1923 increased from 367 to 746 pounds or 379 pounds representing 103.5 per cent. On the other hand, the gain in pig iron in this period was only from 466 to 631 pounds or 165 pounds equivalent to 35.4 per cent.

Steel Becomes the Index

It seems to be indicated from these comparisons, therefore, that steel, more than pig iron, has become the index to the growth of consumption power and of industrial expansion in the country. This fact is further emphasized by the constant enlargement of steel capacity which is going forward from year to year notwithstanding the abnormal extension that was crowded into the war years. Bearing on this point is the fact that since the war, steel capacity has been increased by a much larger ratio than pig iron, even though this has been moderate when compared with similar periods of the past. At the present time, a large amount of new steelworks construction is under way which will add fully 1,100,000 tons of ingots to the country's capacity. A still further side-light upon this question is the fact that a very large unsold tonnage of pig iron was accumulated in the hands of the merchant producers the past year. At the end of 1923 this was something like 1,000,000 tons representing the largest stocks in several years. Some explanation of this backing up of unabsorbed tonnage with the merchant furnaces may be found in the activity as sellers in the market the past year of steelworks furnaces. Probably not in years has so much steelworks iron been offered on the market as in 1923 and this usually at prices which displaced tonnage ordinarily made by the regular merchant plants. Another factor was the unusual importation of foreign pig iron.

On the contrary, steel stocks as far as can be judged have not been backing up but have been going into consumption.




MACHINE TOOL SHIPMENTS
Percentage Deviation from Normal
of 29 Makers of Standard Tools
Compiled by National Machine
Tool Builders' Association
Machine Tool Shipments
Per Cent
Copyright 1923
IRON TRADE
CLEVELAND
1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
100 80 60 40 20 0 20 40 60 80

Because of its character as a material, the wide range of finished forms in which it is sold and the various individual purposes to which it is put, steel customarily is not allowed to pile up in the hands of producers. Common practice sees to it that relatively little steel is made or rolled except to buyers' specifications. This regulates production in close keeping with consumption demand. It encourages the belief that unlike pig iron little of this steel made the past year did not pass to the satisfaction of buyers' wants. Hence, it is fair to assume that the output of steel in 1923 resulted largely because consumption required it.

Perhaps this steelworks capture of a larger portion of the pig iron market on the scale of the past year is not a permanent thing. Recent consolidations of steelworks properties, undoubtedly have brought about an overbalanced situation with these larger companies, in that their pig iron capacity has exceeded their finishing plants either in total or with respect to the location of certain operations. One thing is certain, however, that the tendency of steel companies in this position will be to round out their steel works and finishing capacities because they are organized primarily to make and sell steel and not pig iron. This is borne out by the number of new open-hearth furnaces and finishing mills that are under construction or are included in the ambitious programs of extensions which certain companies have laid out. On the other hand some close observers of the trend of conditions believe that more and more the sale of pig iron for general use will gravitate into the hands of steel companies. This is because the scale of their operations allows them to make iron more cheaply and the open market offers to them an opportunity to stabilize their production against sharp fluctuations of steel demand.

The point of this is that while undoubtedly there was an over-production of pig iron for sale the past year as the undistributed stocks show, and under the present unbalanced position of certain steel companies, such a condition of virtual over-capacity may last for some years to come, what is true of pig iron does not necessarily apply to steel. The country's absorption of steel is going ahead at a much larger rate than in pig iron and this promises to be continued. The country, to all signs, is operating on a steel and not a pig iron basis.

The question of capacity undoubtedly has had an important bearing upon the matter of iron and steel earnings the past year. While steel producers have made fair profits and in some cases liberal ones, the merchant pig iron industry can make no such showing, collectively speaking. In fact, many merchant furnaces in the last half of the year were forced out of blast because the sales price was below their cost of production. Between May and late November pig iron prices fell from $8 to $10 per ton while steel quotations, that is on the major products, were virtually unchanged. In a considerable part the great disparity in the positions of the steel and pig iron producers was due to the better controlled situation in steel since two-thirds of the total capacity of the country, as a result of recent consolidations, now is in the hands of the four largest companies. Nevertheless the situation undoubtedly is a reflection of the excess capacity that was available for the market in pig iron during the past year.

All things considered, the foundry industry has had a good year in 1923 and has been well occupied with casting business of a diversified character. The rise of the automotive industry in recent years has been a big boom to the foundry business. With the saturation point in the absorption of automobiles apparently not yet reached in this country and expansion of that industry still in progress, it does not seem probable that the casting plants of the country at present are seriously threatened with the results of any overbuilding. Heavier volume of railroad buying and the favorable prospects for its continuance in the future supplies another strong indication for the favorable utilization of present foundry capacity especially in the line of steel castings. Based on reports from over two-thirds of the capacity of commercial steel castings in the country made to the department of commerce, bookings for the eleven months of 1923 up to December averaged 77.6 per cent. Railroad demands furnished about 45 per cent of the total business of the year in steel castings.

The building industry has been taking up a large fraction of the country's cutput of gray iron castings and the present outlook is for a prolongation of this demand since a very large volume of work is in sight. The proportion of

(*Concluded on Page* 16)

Finding Work for Idle Equipment

Many Companies Are Engaging in Manufacture of Secondary Products To Absorb Facilities Not Required by Usual Operations—In a Few Cases, Supplementary Work Has Proved Highly Profitable

BY E. L. SHANER

JAMES KENNEDY, general manager of the Federal Mfg. Co., was visiting his friend, John Bristol, president of the Empire Machine Tool Co. Having concluded their conference, which had to do with the affairs of the local manufacturers' association in which both held office, Kennedy was on the point of departing when Bristol invited him to take a walk through the plant.

As they stepped from the rear door of the office and started down the walk leading to the factory building, the conversation turned to business conditions.

"Well, John, how's the machine tool business?" queried Kennedy.

"Oh, it's only fair," replied Bristol. "We're doing only about 60 per cent of what we could do if we had the orders. However, we're better off than lots of our competitors, so I suppose we ought to be satisfied. You know, Jim, the demand hasn't been right since 1920; too many used machines on the market."

At this point they entered the plant and walked slowly through the aisle of one of the machine shop bays. As they were passing a row of gear hobbers, Kennedy stopped suddenly.

"I didn't know you had so many of these machines. What do you do with them?"

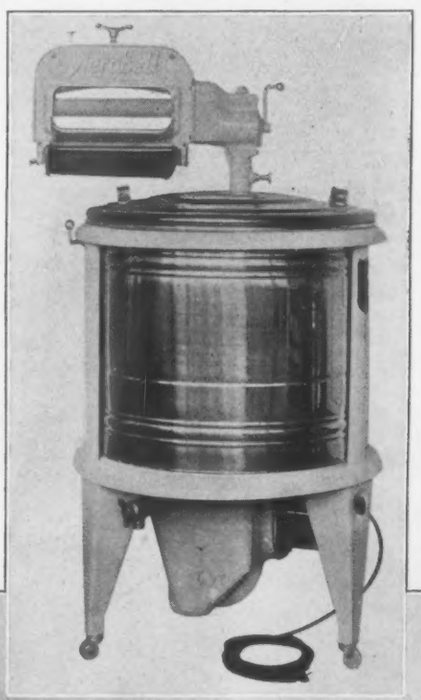
"The truth of the matter," explained Bristol, "is that we don't need all of them. We bought a few to help out during the war, but since that time we haven't had enough work to keep them busy. We don't want to sell them because we can't get a decent price and, moreover, sometimes we have a rush of gear work to handle in a hurry. It's nice to know they are there, ready for use when the need arises."

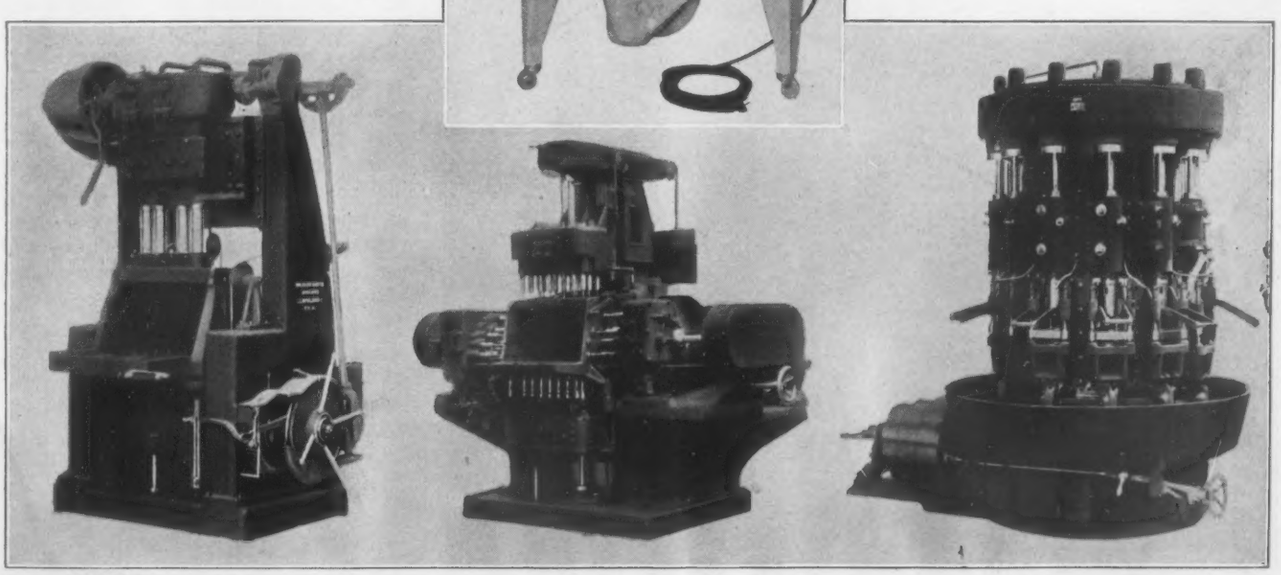
"So that's the situation," mused Kennedy. "Say," he exclaimed suddenly, "why can't you put those extra machines to work for us? We can't afford to buy hobbers for our own plant because our gear work comes in so irregularly that we couldn't keep the machines busy more than half of the time. Why right now the Jones & Knight Machine & Foundry Co. are cutting a big order of gears for us. Think of it! They are 200 miles away, and here you—less than half a mile from our plant—have the facilities to do the work. I declare, John, I wish I had known of this before. We could have saved a lot of time and money. What do you say to the proposition?"

"Sounds reasonable," admitted Bristol. "Send over your blueprints and specifications on the next job and let us show you what we can do."

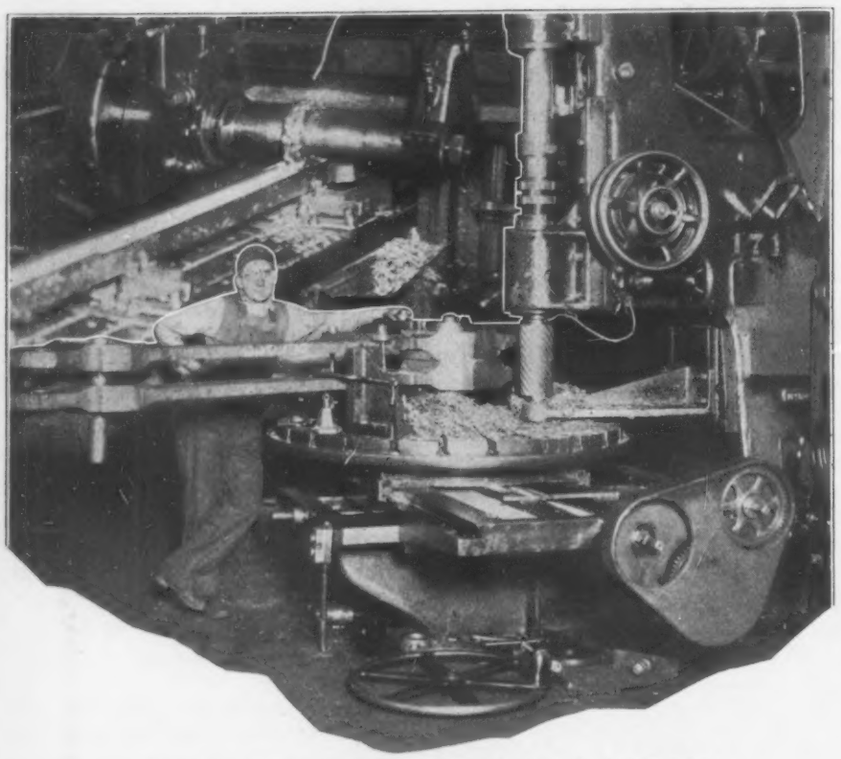
Six months later the Empire Machine Tool Co. not only had completed several contracts for the Federal Mfg. Co. to the entire satisfaction of the officers of both companies, but had taken on sufficient jobbing work from other nearby manufacturers to insure the steady and profitable operation of all departments of the plant. Kennedy's chance visit and subsequent contract served to awaken the president of the machine tool company to the possibilities of rounding out production by fill-in work and he had not been slow to act.

Except for the names and a few





THE WASHING MACHINE, SHOWN ABOVE, NOW MANUFACTURED BY THE FOOTE-BURT CO., IS CONSIDERED AS MUCH A REGULAR PRODUCT AS ITS LINE OF MULTIPLE-SPINDLE DRILLS

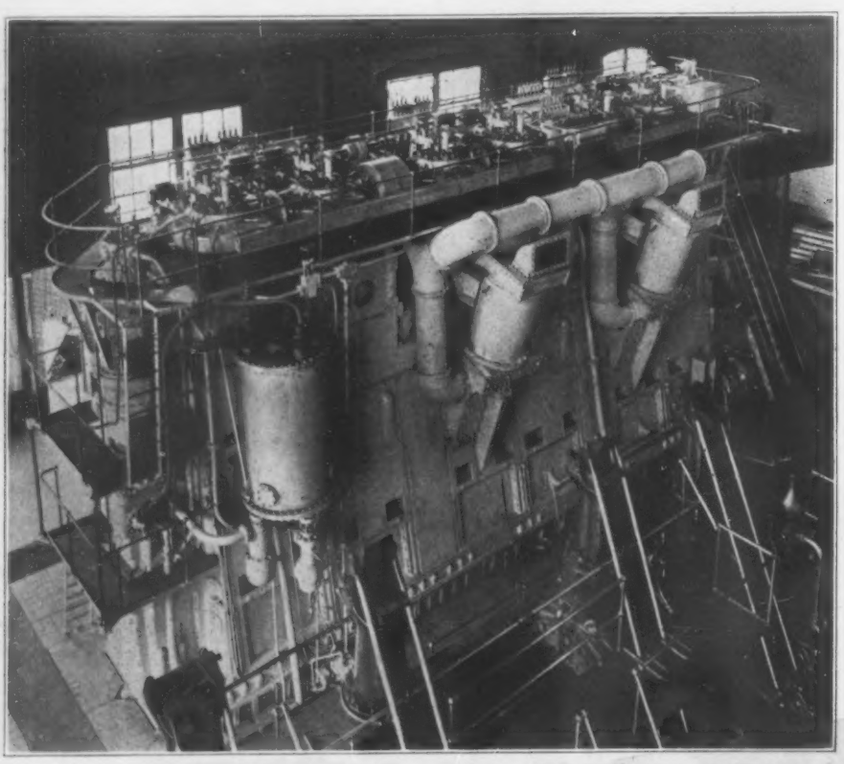


TWO STEPS IN MACHINING LOCOMOTIVE SIDE RODS

minor details, the foregoing is a true story. It is typical of what scores of executives have done in 1923 and what many more could have done had they recognized their opportunities and acted upon them.

There is nothing original in what John Bristol did. For years it has been customary in many plants to take on jobbing work to help round out operations. But what is unusual, and significant enough to justify this article, is that in 1923 many manufacturers turned to contract work and secondary lines of production who never before had as much as considered the act. Machine tool builders who previous to 1923 had believed it almost treason to depart from the business of building tools, eagerly turned to the manufacture of articles which only remotely resemble their usual products. Engineering firms, engaged for decades exclusively in the construction of cranes, steelworks equipment and heavy machinery, abruptly discarded tradition and sought orders for car and locomotive repair work. Shipbuilders, who until recently had been content to sit back and watch their business rise and fall with the ebb of shipbuilding activity, started to build diesel engines, turbines, oil combustion systems and other equipment more or less foreign to their principal lines of work. The number of executives who adopted this policy and the extent to which they have relied on these so-called "side lines," mark 1923 as a year in which unprecedented attempts have been made to right the unbalanced economic structure of industry.

The reason for this unusual tendency is found in the comparison of business conditions in various branches of manufacturing. Plants engaged in making electrical equipment, automobile parts and accessories, and household appliances such as washing machines, vacuum cleaners, etc., have been exceedingly busy during the year. On the other hand, shipbuilders, engineering firms, and manufacturers of machine tools have not had sufficient work to keep their plants operating at anything near capacity.



A 4000-HORSEPOWER OIL ENGINE OF INDEPENDENT AMERICAN DESIGN HAS BEEN DEVELOPED BY THE BETHLEHEM [illegible]

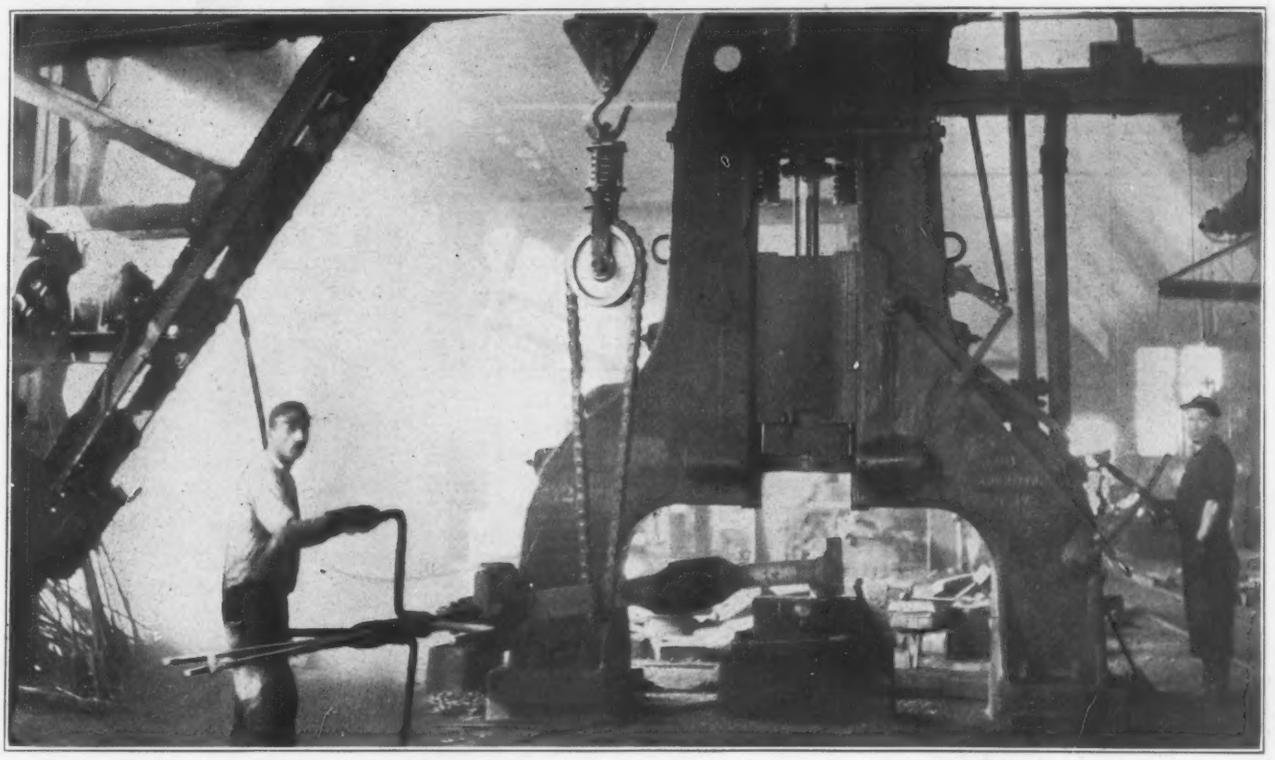
In view of these conditions, it is only natural that manufacturers confronted with the prospect of dull business in their usual spheres of activity should seek more fertile fields. In the case of the shipbuilders, the necessity for indulging in supplementary work is especially urgent. During the 10 years preceding the last war, American shipyards turned out an average of about 230,000 tons of steel ships annually. In 1920 the production had soared to about 3,300,000 tons. At the present time about 175,000 tons of ships are being built, which although amounting to more than 75 per cent of the prewar average, represents only about 15 per cent of existing capacity. The four-power agreement on disarmament also cut in heavily on the normal business of the shipyards. In 1921, more than 100,000 tons of the 390,000 tons of new ships constructed represented work for the United States navy. This source of income soon will be practically cut off, as far as private shipyards are concerned.

One of the first acts of shipyard managers to offset the absence of new

tonnage on their ways, was to concentrate on repair work. The reconditioning of the LEVIATHAN and other shipping board vessels helped tremendously in enabling a few yards to hold their organizations intact.

However, these contracts offered only a temporary relief and affected comparatively few shipyards; consequently the search for other sources of employment was continued. A few companies, including the Sun Shipbuilding & Dry Dock Co., New York Shipbuilding Corp., William Cramp & Sons Ship & Engine Building Co., and others, secured the American licenses for building diesel engines of foreign design. The Bethlehem Shipbuilding Corp. used part of the facilities of its Fore river plant for repairing locomotives for the New York, New Haven & Hartford Railroad Co. The New York Shipbuilding Corp. absorbed part of its excess capacity in fabricating caissons for the Philadelphia-Camden bridge over the Delaware river. A number of other shipbuilding companies turned to fabricating work, including the construction of transmission towers, tanks, etc. This work has not proved desirable in all cases, and has been abandoned by a few yards.

One of the most interesting examples of the adoption of supplementary contract work is found in the activities of the Newport News Shipbuilding & Dry Dock Co. At the time the reconditioning of the LEVIATHAN was nearing completion, this company faced the necessity of laying off 3000 men unless new contracts were forthcoming soon. This was in spite of the fact the company was building steel cars for the Chesapeake & Ohio railroad, making steel wheels for automobiles and executing other contracts. On the Thursday before work on the LEVIATHAN was completed, word came that the contract for reconditioning the PRESIDENT BUCHANAN had been awarded to the Newport News yard. Since that time the company has taken over the turbine business of the Wellman-Seaver-Morgan Co., Cleveland, which makes the Newport News concern one of the three largest competitors for the hydroelectric turbine work of the country.

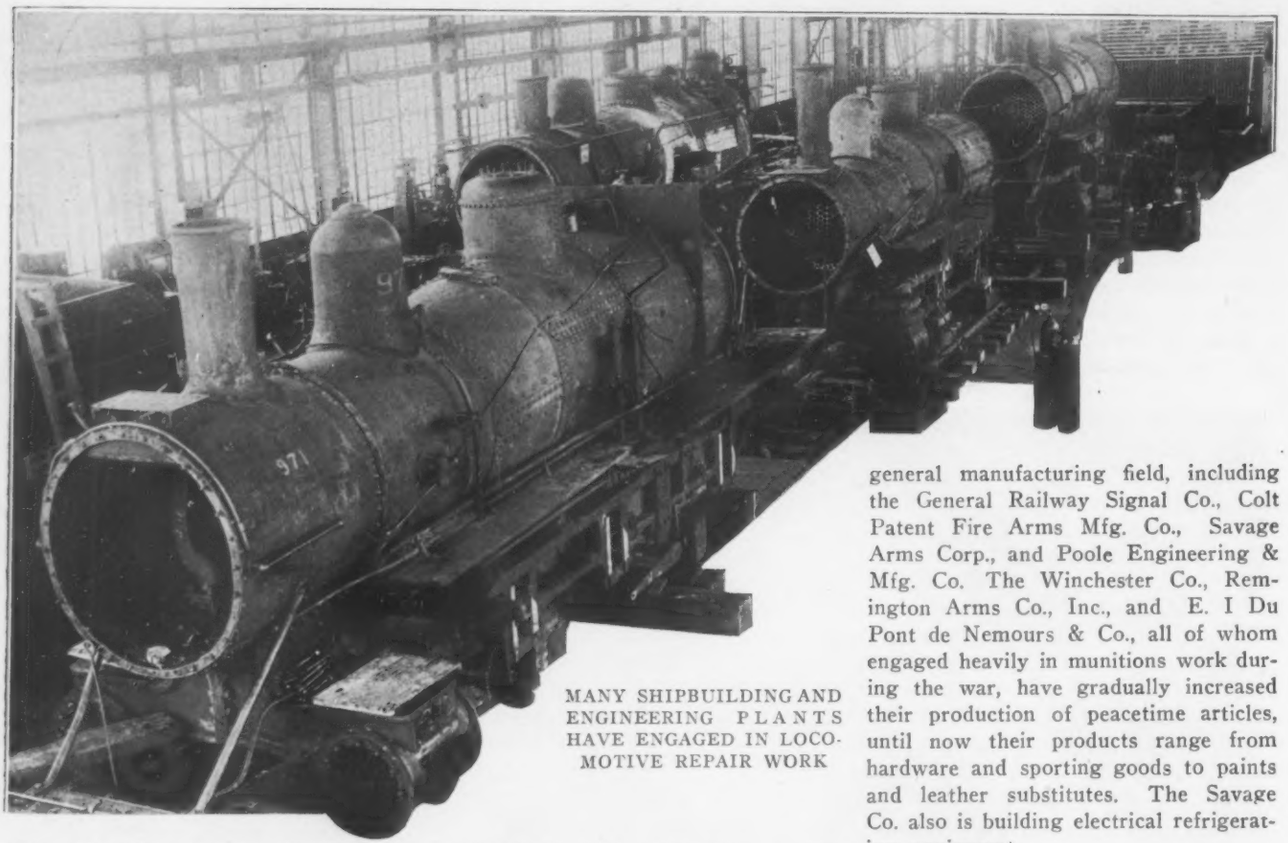


FORGING LOCOMOTIVE SIDE RODS AT THE PLANT OF THE McMYLER-INTERSTATE CO. UNDER HAMMERS PURCHASED FOR PRODUCING SHELL FORGINGS

New Work for Heavy Presses

Although 1923 was an exceptionally good year for the majority of iron and steel producers, the few companies who had maintained facilities for making armor plate, gun forgings and other heavy ordnance forgings normally do not receive enough peacetime orders to justify operating their heavy presses. During the past year or two, however, there has been a tendency to employ the idle presses and hammers on commercial work heretofore accomplished by other methods. Activities in this direction were ably described by John L. Cox, assistant to the president, Vale Co., Philadelphia, in a paper presented at the last meeting of the American Iron and Steel institute. Mr. Cox explained how a drum for a boiler designed to use 1200 pounds pressure was made by punching a large billet and drawing it out over a mandrel to the desired size under a hydraulic forging press. Reaction chambers used in obtaining gasoline from crude oil, large alloy steel rings, and other cylindrical products are being made by the same process. The large presses also are being used to forge heavy crankshafts, steel rolls, gyroscopic stabilizer rings and massive entablatures of nickel steel. The increasing demand for machine parts to withstand high pressures may afford more work for heavy presses.

The Bethlehem Steel Co. has been active in seeking work for its numerous foundry, forge, machine shop and fabricating departments. Its foundries are producing segments for the New York-New Jersey vehicular tunnel and its pressed steel shop is engaged in forming and fabricating numerous articles of pressed metal. One of the most unusual products is a tractor wheel formed by slitting and punching large I-beams, and bending the resulting pieces so that the remaining portions of the web form the spokes and the flanges serve as treads. The Bethlehem company recently has tested its second 4000-horsepower diesel engine for marine service. This unit is of independent design, and represents the first important American attempt to enter the diesel engine



MANY SHIPBUILDING AND ENGINEERING PLANTS HAVE ENGAGED IN LOCOMOTIVE REPAIR WORK

field, which thus far has been monopolized by units of European design.

The volume of new construction and repair work in the metal working industries has been sufficient to compare favorably with that of normal years, but a number of engineering firms whose plants were expanded during the war now have more capacity than can be absorbed by the existing demand for their regular products. This is especially true in the case of builders of cranes and heavy machinery. The presidents of some of these companies secured contracts for repairing cars and locomotives for the railroads. The Morgan Engineering Co. and the McMyler-Interstate Co. were among the crane builders to engage in locomotive repairs.

Forges Locomotive Side Rods

The McMyler-Interstate Co. confronted an unusually severe situation because of the expansion of its forging capacity during the war to make shell forgings. When the ordnance contracts were completed, the company had to fall back on its usual operations, consisting of the building of cranes, pile drivers, power shovels, car dumpers, etc. The forging capacity, however, far exceeded the requirements, and in the search for employment for the idle hammers, it was decided to experiment with the production of locomotive main and side rods. The rods are forged from carbon or alloy steel billets and machined on slab and vertical milling machines. Although the company has been engaged in this work for scarcely more than a year, it has developed a dependable business and not only is receiving substantial orders from many of the railroads but is stocking rods of standard dimensions for prompt shipment.

Many of the eastern engineering companies have turned to "side-lines" in recent years. The Poole Engineering & Mfg. Co. engaged in the manufacture of washing machines and the Treadwell Engineering Co., the Southwark Foundry & Machine Co., Birdsboro Steel Foundry & Machine Co., American Engineering Co. and others have engaged in activities secondary to their routine operations.

Machine tool builders have just emerged from another dull year. Shipments were about 40 per cent of normal, due largely to the fact that the wartime surplus has not been absorbed. The result has been that tool manufacturers to a surprising number have shifted to the production of machinery not designed for use in the metalworking industries. In most cases, those who have made drastic changes in their policies have turned to the production of household equipment.

The Foote-Burt Co. and the P. A. Geier Co. are manufacturing washing machines. The Scott & Fetzer Co., which until a few years ago conducted a jobbing machine shop, now is devoting practically all of its facilities to the manufacture and sale of vacuum sweepers.

The washing machine business has attracted a number of companies in the general manufacturing field, including the General Railway Signal Co., Colt Patent Fire Arms Mfg. Co., Savage Arms Corp., and Poole Engineering & Mfg. Co. The Winchester Co., Remington Arms Co., Inc., and E. I Du Pont de Nemours & Co., all of whom engaged heavily in munitions work during the war, have gradually increased their production of peacetime articles, until now their products range from hardware and sporting goods to paints and leather substitutes. The Savage Co. also is building electrical refrigerating equipment.

Works Out Production Plan

Of the companies now buiding washing machines, the Foote-Burt Co. seems to have been unusually foresighted in planning for the future. Some time ago the company was given a contract to build a certain type of washing machine. Later the patents, selling rights, etc., were bought outright, enabling the Foote-Burt Co. to control every phase of the production and selling policies. The problem then was studied critically, with a view of co-ordinating each machining and assembling operation so that machines could be produced according to a predetermined schedule. The present methods gradually are being modified to conform to this plan, and ultimately, when the final changes are completed, parts will pass from the receiving to the delivery end of the plant with the same precision that marks the assembly of the modern automobile.

The washing machine no longer is considering a "side line" by the Foote-Burt executives. Attention is being given to sales problems and the inauguration of a model store, in which distributors may be instructed in effective selling methods, is being considered.

It must not be assumed that supplementary work has proved successful in all cases. Not a few companies have been unfortunate in their experience with "side lines." It is hoped the factors governing success may be considered in a future article.

Railroad Consumption Amazing

Carriers' Steel Requirements in 1923 Dominated All Others, Representing 30.78 Per Cent of Total—Structural Purposes Account for 15.77 Per Cent; Automobiles 10; Exports 6.27—Nearly All Lines Increased

BY E. C. KREUTZBERG

RAILROAD consumption of steel dominated all other requirements of the country in 1923. The figures of tonnage absorbed tell an amazing story of the aggressive and systematic efforts the carriers are making to rehabilitate themselves for adequate transportation service to the country, an objective which the present reign of more efficient management has set before itself as fundamental to the fulfillment of its great task. About one-third of the total output of the steelworks of the country was applied last year to the carrying out of this program. Steel companies representing three-fourths of total capacity during 1923 shipped 30.78 per cent of their output either to the railroads direct or for manufacture into railroad equipment or appliances. The amount thus reported was 6,935,653 tons. On this basis the calculated total of all steel shipped by all steel companies for direct and indirect railroad consumption during 1923 was 9,437,235 tons.

THE two reproduced ingots below show the division in percentages of finished steel output in 1923 and 1922 as compiled from returns of the producers to IRON TRADE REVIEW.

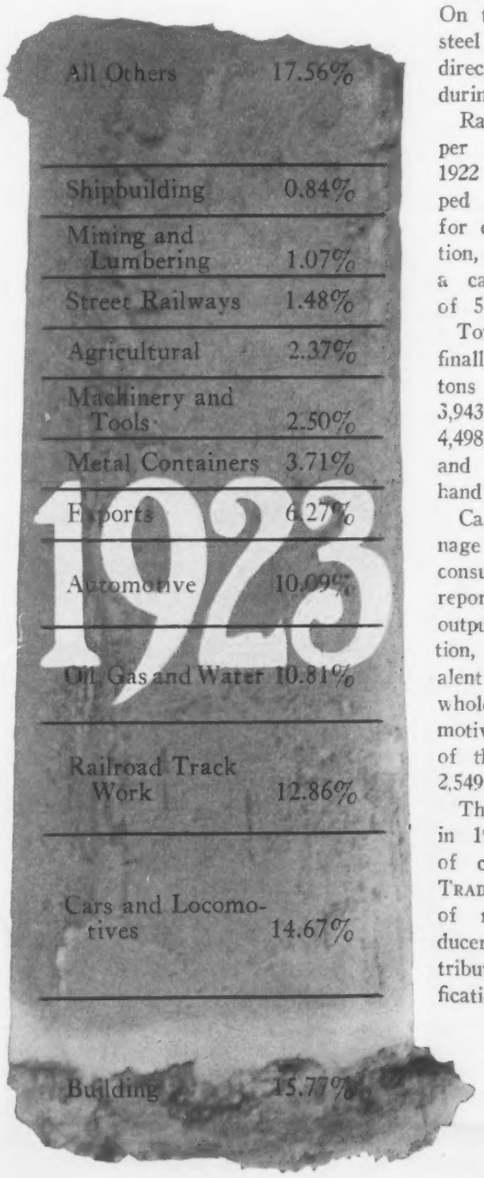
Railroad consumption in 1923 was 66½ per cent greater than in 1922. In 1922 the steel companies reporting shipped 24.84 per cent of their output for direct and indirect railroad consumption, or 4,016,786 tons. This represented a calculated total railroad consumption of 5,567,000 tons in 1922.

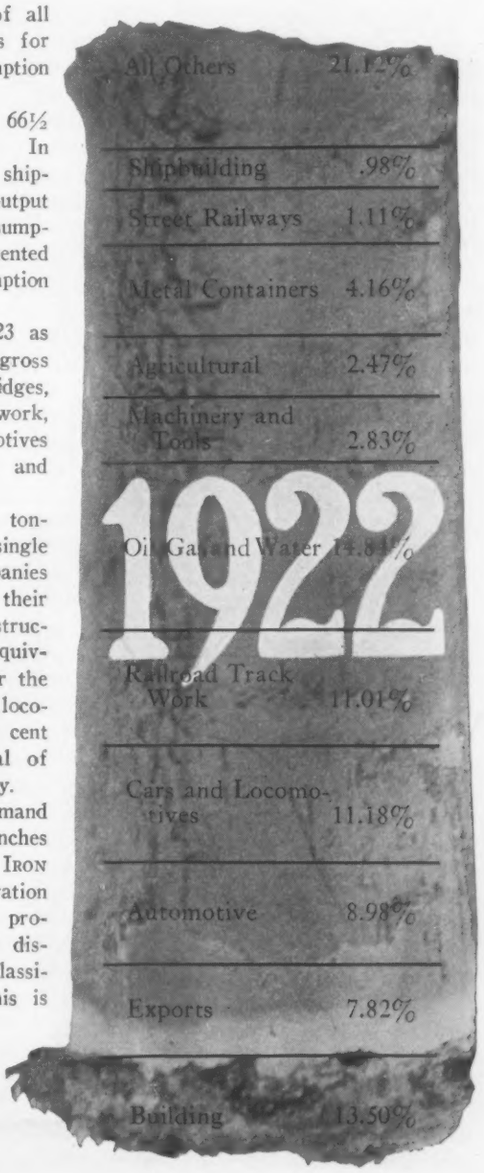
Total railroad consumption in 1923 as finally estimated includes 742,100 gross tons for railroad buildings and bridges, 3,943,540 tons for railroad track work, 4,498,600 tons for cars and locomotives and 185,920 tons for machinery and hand tools.

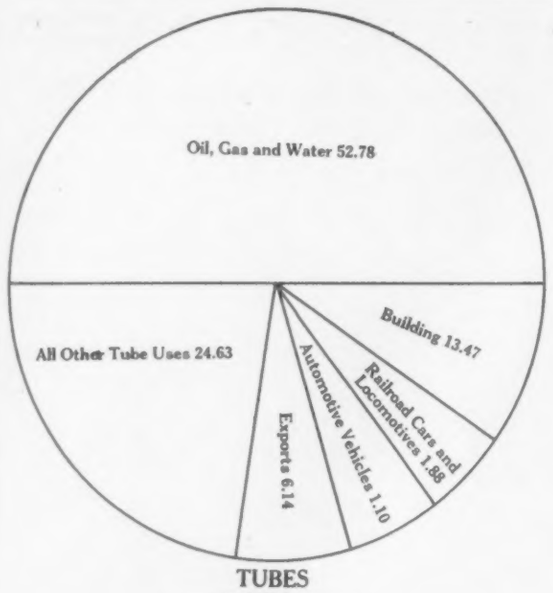
Cars and locomotives took more tonnage during 1923 than any other single consuming group. The steel companies reporting shipped 14.67 per cent of their output for car and locomotive construction, or 3,306,577 tons. This is equivalent to a total of 4,498,600 tons for the whole industry. In 1922 cars and locomotive construction took 11.18 per cent of the output, or a calculated total of 2,549,500 tons for the entire industry.

These exact figures of railroad demand in 1923 and of other leading branches of consumption are presented by IRON TRADE REVIEW through the co-operation of most of the principal steel producers, in reporting in detail their distribution of steel by consuming classifications during the year 1923. This is the third presentation of such tabulations which heretofore have not been available to the steel industry before this work was originated by IRON TRADE REVIEW two years ago. The figures for 1923 are compiled from the reports of producers controlling 73.52 per cent of the country's ingot capacity, which compares with 70.88 per cent for 1922.

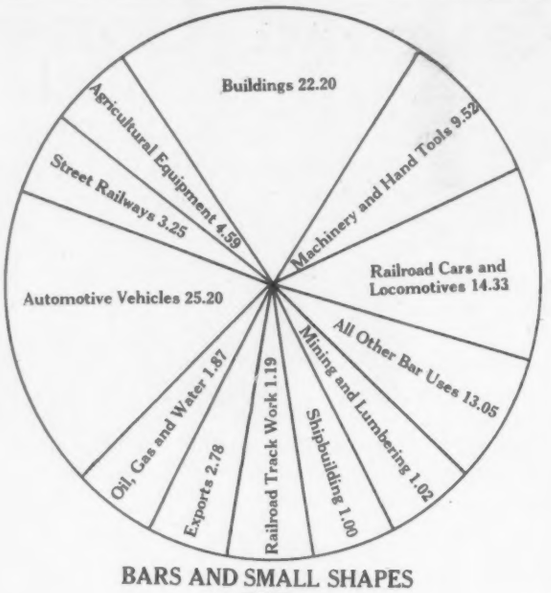
Steel for structural purposes of all kinds took 15.77 per cent of the 1923 output, or a calculated total for the whole industry of 4,835,900 gross tons. Of this, 742,100 tons went into railroad structures, and the remaining 4,093,800 tons into all others. In 1922 the calculated total was 3,079,350 gross



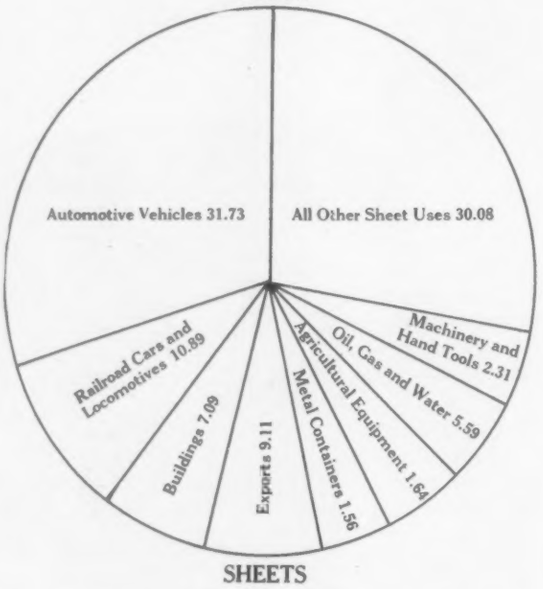




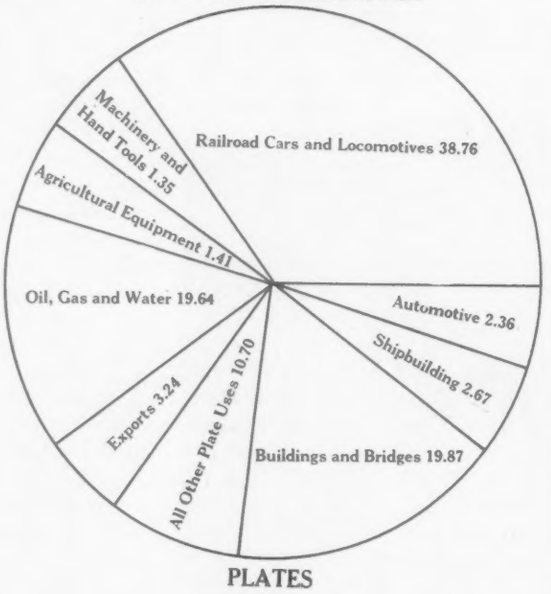
TUBES



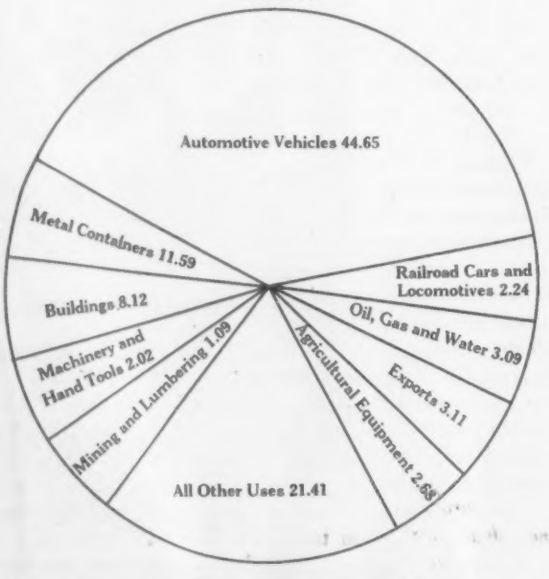
BARS AND SMALL SHAPES



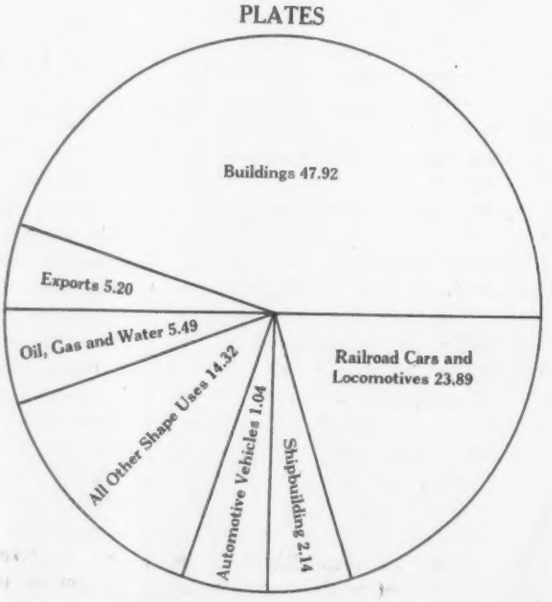
SHEETS



PLATES



HOOPS, BANDS & COTTON TIES



STRUCTURAL SHAPES

THESE GRAPHS ILLUSTRATE BY THEIR APPORTIONMENT IN PERCENTAGES HOW THE 1923 OUTPUT OF LEADING FORMS OF STEEL WAS CONSUMED

tons for the whole industry, or 13.50 per cent of the whole output, and of the total 378,530 tons went into railroad structures and 2,700,820 tons into all other structures. Hence structural purposes in 1922 absorbed only 63½ per cent of the total in 1923.

Railroad track work was a large single item in 1923, taking 12.86 per cent of the output, or a calculated total of 3,943,540 gross tons for the whole country. This compared with 2,512,100 tons in 1922, which was 11.01 per cent of the 1922 output.

Automotive Consumption Doubles

Despite the fact that oil, gas and water requirements took 10.81 per cent of the 1923 output, as compared with 14.84 per cent in 1922, the consumption by this group was only about 1 per cent less in 1923 than in 1922. The calculated total that went into this class of consumption in 1923 was 3,314,900 tons, compared with 3,384,450 tons in 1922.

Consumption by the automotive industry showed a gain of approximately 50 per cent in 1923 over 1922. The automotive industry in 1923 took 10.09 per cent of the output, or a calculated total for the industry of 3,094,100 gross tons. This compared with 8.98 per cent or 2,048,000 tons in 1922.

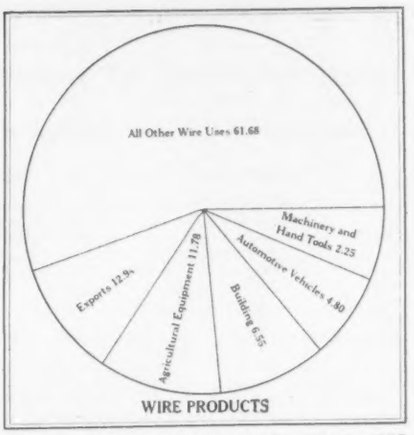
Exports took 6.27 per cent of the 1923 output, or a calculated total of 1,922,700 tons for the whole industry. In 1922 exports took 7.82 per cent of the total or 1,786,500 tons.

Metal containers in 1923 absorbed nearly 20 per cent more steel than in 1922. This outlet accounted for a calculated total of 1,137,670 gross tons in 1923 or 3.71 per cent of the output. The same group took 949,200 tons in 1922, which was 4.16 per cent of the production that year.

Consumption in machinery and hand tool manufacture increased nearly 19 per cent in 1923 as compared with 1922. This group took a calculated tonnage of 766,650 gross tons or 2.50 per cent of the 1923 output. In 1922 this classification took 645,200 tons or 2.83 per cent of the total.

Agricultural implements and supplies took a calculated total of 726,760 gross tons or 2.37 per cent of the whole production in 1923. The consumption in this group increased nearly 29 per cent in 1923. This group took a calculated total of 563,800 tons in 1922 or 2.47 per cent of that year's production.

Street railway consumption was calculated at 453,850 gross tons for 1923, or 1.48 per cent of the output. In 1922 this group absorbed 252,070 gross tons or 1.11 per cent of the total production. Even shipbuilding consumption showed a slight increase in 1923 but the total was insignificant, amounting only to 257,600 gross tons, or 0.84 per cent of the output. In 1922 shipbuilding took 223,100 tons or 0.98 per cent of the output that year. Mining and lumbering consumed a calculated total of 328,140 gross tons in 1923 or 1.07 per cent of the total output. This is a new classification not previously reported.



HOW WIRE PRODUCTION WAS DISTRIBUTED IN 1923 AMONG PRINCIPAL CONSUMING INDUSTRIES, PERCENTAGES BEING SHOWN

The figures reported under "all other requirements" comprised only 17.56 per cent of the 1923 total as compared with 21.12 per cent for 1922. The classification of mining and lumbering as a separate group accounted for some of the difference. As stated a year ago, none of the figures shown in this compilation can be regarded as being strictly accurate. The mills furnishing the figures were asked simply to report their best estimates. Inasmuch as few of them had reliable data on the distribution of their steel to the ultimate consuming classifications, the figures generally represent the best judgment on the part of the companies making them. While errors undoubtedly have been made, it is believed that they are largely of a compensating character, and that the percentage of error is not sufficiently large to affect the approximate value of the figures.

Just how close the distribution shown in the accompanying tables will approach the 1923 production is not known. A year ago, IRON TRADE REVIEW reported on a distribution of 22,811,000 gross tons for the whole industry as of the year 1922. Later the American Iron and Steel institute reported finished rolled production during 1922 was 25,546,907 gross tons. Thus, the institute reported production of nearly 12 per cent more steel than IRON TRADE REVIEW reported as having been distributed. Part of the difference was due to the fact that the IRON TRADE REVIEW's figures did not include considerable product which was rolled from scrap. The disparity probably was due principally, however, to different methods employed by the mills in reporting their production figures and estimating their distribution. Ingot production for 1923 is expected to total around 43,380,000 gross tons, equivalent to approximately 32,060,000 gross tons of finished rolled product, which represents about 4 per cent disparity from the estimated 1923 distribution of 30,665,200 tons shown in the accompanying tables.

Concrete construction accounted for considerable increase in the use of steel during 1923, due to the development of greater engineering ability in building permanent concrete structures. Consumption of reinforcing wire has doubled, and now is estimated at 100,000 tons a year. Use of reinforcing bars has increased tremendously, particularly for road work. A growing demand for reinforcing steel is noted in connection with the increased construction of concrete pipe. The largest job of this kind ever undertaken was completed during 1923; this was the concrete pipe line at Tulsa, Okla., for which 4000 tons of steel bars and 3000 tons of wire mesh were needed. Concrete is being introduced for strengthening the levees along certain parts of the Mississippi river and this is taking more steel.

Use More Steel For Building

The field for the use of steel in building construction appears boundless. Plans now are being developed to build houses with concrete blown with an air gun on to electric welded steel mesh. This form of construction recently has been employed successfully in building partitions in the schools of New York City. Plans also are in the course of development for the building of combination steel frame and concrete dwelling houses. The use of steel furniture and steel building trim has been increased greatly, al-

Third Annual Analysis Is Presented

IN THIS article IRON TRADE REVIEW *presents its third annual analysis of finished steel distribution by leading consuming groups. This survey of the actual destination of mill output by form and quantity represents a statistical study which was originated and now is exclusively carried out by* IRON TRADE REVIEW. *It has proved of inestimable value to the iron and steel industry because it supplies an accurate portrayal of distribution, official data on which heretofore has been lacking. This analysis has been accomplished from year to year by the expenditure of much time and effort and through the co-operation of individual steel companies in supplying the record of their actual shipments and the ultimate purposes for which the latter were intended.*

Distribution in Tons of Output of Finished Steel in 1923

Shown by Consuming Groups and Individual Product

Based on Reports of Companies Controlling 73.52 Per Cent of Country's Steel Ingot Capacity

	Heavy rails	Light rails	Angle bars, steel ties and other track accessories	Plates	Structural shapes	Bars and shapes under 3-inch	Hoops, bands and cotton ties	Black plates for tinning	All other black plate and sheets	Tubing and pipe	Wire products	All other finished steel products	Totals
1. Railroad buildings and bridges	1,655	522	505	192,644	153,042	121,522	224	.....	9,447	.....	13,624	51,000	544,485
2. Other buildings and bridges	681	187	143	395,809	1,042,785	711,417	38,252	16,800	173,435	368,803	103,925	158,472	3,010,709
3. Railroad track work	2,219,179	5,222	557,762	8,024	669	44,823	7	.....	.....	180	9,204	53,601	2,898,671
4. Street railways	130,401	271	24,518	3,008	2,230	121,850	95	.....	1,317	3,662	5,463	40,255	333,070
5. Automotive vehicles	.....	84	227	70,010	26,042	945,952	211,595	.....	819,005	30,240	86,049	85,303	2,274,507
6. Railroad cars and locomotives	95	3	379	1,148,128	596,011	537,876	10,630	.....	281,136	51,600	16,063	664,656	3,306,577
7. Oil, gas and water requirements	773	143	222	581,575	136,988	70,279	14,645	.....	144,268	1,445,752	14,310	27,490	2,436,445
8. Mining and lumbering	21,016	106,492	27,145	11,579	5,657	58,222	5,185	.....	687	492	12,447	12,700	241,622
9. Agricultural equipment	799	.....	64	41,779	24,506	172,245	12,705	.....	42,261	.....	211,150	28,632	534,141
10. Metal containers	.....	.....	.....	5,792	715	4,277	54,899	711,198	40,129	3,661	11,364	5,089	837,124
11. Shipbuilding	63	24	5	79,122	53,256	37,501	649	.....	2,667	3,203	1,454	10,800	188,744
12. Machinery and hand tools	238	517	192	40,000	16,559	357,421	9,590	.....	59,586	.....	40,368	38,922	563,393
13. Exports	202,467	7,920	18,374	96,105	129,692	104 267	14,713	84,968	235,080	168,155	232,054	122,256	1,416,051
14. All other requirements	17,264	25,319	15,390	288,309	306,971	485,668	100,687	65,000	772,306	663,461	1,035,664	183,526	3,959,565
Totals	2,594,631	146,704	644,926	2,961,884	2,495,123	3,753,620	473,876	877,966	2,581,324	2,739,209	1,793,139	1,482,702	22,545,104

though it has not yet been adopted to any extent in dwelling houses.

Demand for steel strapping for shipping cases is increasing greatly. In 1922 a certain large fruit industry scrapped only 6 per cent of its boxes, while 13 per cent was scrapped in 1923. While flat and round wire straps are used the tendency is to use rounds more extensively.

Demand for corset wire which used to average 12,000 tons a year, now is less than 4000 tons yearly. Hat rim wire has shrunk greatly in consumption owing to the great curtailment in the use of derby hats.

Greatly increased use of steel is entailed in the growth of the hydroelectric industry, and it is considered that this will continue to be a rapidly growing field, taking large tonnages for penstocks, concrete dams, machinery, transmission towers, etc. Larger tonnages of structural steel went into cofferdam work, bulkheading and pier construction during 1923 than any previous year. This work also absorbed much steel piling and concrete reinforcing steel.

Steel for casket construction has doubled, but is relatively small being only about 4000 tons a year. This consumption comprises largely cold-rolled strip steel. A potential consumer of the future, it is believed, is the all-steel airplane. Inasmuch as aluminum is a comparatively expensive metal, it is expected that steel in the form of sheets, light strip and wire, will be utilized for airplane construction in proportion with the progress in this field. Demand for spring wire has continued its amazing growth, due largely to the employment of more springs in automobile upholstering. Wire manufacturers report that the vogue in overstuffed furniture also has brought about a great increase in the use of spring steel.

An entirely new use for steel recently was developed by one maker of steel beams. Portions of the web are stamped cut and the beam then rolled into a truck wheel, what is left of the web constituting the spokes of the wheel.

Sheet and strip steel are being em-

Distribution by Percentage of Output of Finished Steel in 1923

Shown by Consuming Groups and by Individual Product

Based on Reports of Companies Controlling 73.52 Per Cent of Country's Steel Ingot Capacity

	Heavy rails	Light rails	Angle bars, steel ties and other truck accessories	Plates	Structural shapes	Bars and shapes under 3-inch	Hoops, bands and cotton ties	Black plates for tinning	All other black plate and sheets	Tubing and pipe	Wire products	All other finished steel products	Totals
1. Railroad buildings and bridges	0.06	0.35	0.07	6.51	6.13	3.25	0.05	....	0.37	....	0.75	3.44	2.42
2. Other buildings and bridges	0.03	0.12	0.02	13.36	41.79	18 95	8.07	1.91	6.72	13.46	5.80	10.69	13.35
3. Railroad track work	85.52	3.56	86.48	0.27	0.03	1.19	....	....	....	0.01	0.51	3.61	12.86
4. Street railways	5.03	0.18	3.80	0.10	0.09	3.25	0.02	....	0.05	0.13	0.31	2.71	1.48
5. Automotive vehicles	....	0.06	0.04	2.36	1.04	25.20	44.65	....	31.73	1.10	4.80	5.75	10.09
6. Railroad cars and locomotives	0.01	0.01	0.06	38.76	23.89	14.33	2.24	....	10.89	1.88	0.90	44.83	14.67
7. Oil, gas and water requirements	0.03	0.10	0.04	19.64	5.49	1.87	3.09	....	5.59	52.78	0.80	1.85	10.81
8. Mining and lumbering	0.81	72.59	4.21	0.40	0.23	1.02	1.09	....	0.03	0.02	0.69	0.86	1.07
9. Agricultural equipment	0.03	....	0.01	1.41	0.98	4.59	2.68	....	1.64	....	11.78	1.93	2.37
10. Metal containers	....	....	....	0.20	0.03	0.11	11.59	81.01	1.56	0.14	0.63	0.34	3.71
11. Shipbuilding	0.01	0.02	....	2.67	2.14	1.00	0.14	....	0.10	0.12	0.08	0.73	0.84
12. Machinery and hand tools	0.01	0.35	0.03	1.35	0.66	9.52	2.02	....	2.31	....	2.25	2.63	2.50
13. Exports	7.80	5.40	2.85	3.24	5.20	2.78	3.11	9.68	9.11	6.14	12.94	8.25	6.27
14. All other requirements	0.66	17.26	2.39	9.73	12.30	12 94	21.25	7.40	29.90	24.22	57.76	12.38	17.56
Totals	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

ployed more extensively in the manufacture of collapsible shipping boxes, mainly for the shipment of fruit, eggs and other perishable products. More plate tonnage is going into the manufacture of shipping cases.

Four decades ago the quantity of steel sheets produced in this country was insignificant. During the year just closed, however, in excess of 4,000,000 tons were rolled which is equivalent to better than 10 per cent of the finished ingot capacity of the United States. The automotive industry is the largest consumer of sheets and during 1923, when production schedules outdistanced those of any previous year, shipments of steel sheets to this class of the trade exceeded 35 per cent of the nation's hot mill output. The product from the high-grade mills was formed into such parts of automobiles as aprons, cowls, fenders, hoods, radiator casings, splash guards, etc., while the common grade of black sheets were fabricated into parts not requiring a high finish, such as battery boxes, drip apron wings, hot air pipes, mufflers, axle housings, etc. The many purposes for which sheets are used were presented in a table appended to an article in the Aug. 3, 1922 issue of IRON TRADE REVIEW.

The second largest consumer of sheets last year was that class of the trade designated as jobbers whose 1923 purchases accounted for about 15 per cent of the total tonnage of steel sheets rolled by mills in this country. Patrons of jobbing establishments are so diversified that an attempt to ascertain into what channels the sheets pass from this source of supply, would be an endless task. Next in importance from the standpoint of consumption are electrical manufacturers who are credited with using approximately 9 per cent of the national output of sheets for transformers, dynamos, motors, generators, electromagnets, stators, poles, rotors, armature segments and disks, etc.

Substitution of pressed steel for certain articles formerly made of castings and forgings recently has brought about new uses of sheets. Perhaps the most recent applications of steel sheets in this connection is for stove legs and various parts for washing machines and radio instruments. Steel sheets also are finding wide utilization in the production of barrels and on account of the growing scarcity of wood are making vast inroads in the cooperage business. In this connection large tonnages of blue annealed sheets during 1923 were fabricated into small portable tanks for the storage of oil. The past year also reveals a growing demand for high-grade sheets from manufacturers of caskets, metal furniture and lockers who have placed their stamp of approval on this product instead of wood not only because of the possibility of obtaining a highly finished surface in a shorter period of time but because of it being more readily obtainable.

On the threshold of new applications for sheets perhaps no other outlet lends greater possibilities than metal lath. Based upon recent investigation is the assertion that the metal lath industry could not begin to satisfy the demand for this product if the commodity was specified in new residential construction for such places as in stair areaways, corners of dining rooms, halls and living rooms and on the section of floor directly above the heating plant.

Last year also recorded a bumper demand for tin plate, the bulk of which was used directly by consumers affiliated with the canmaking industry. While new applications for tin plate are lacking yet considerable tonnage is being used for decorative purposes than heretofore. The product is lithographed and made into cans and boxes of various sizes and shapes for packing cakes, candies, confectioneries, etc.

That strip steel is growing more into favor with the automobile industry is mirrored by the increase in the application of the product. Large tonnages were consumed last year in the manufacture of fenders and headlights. Automobile tire rims, brake bands and brake drums now are almost entirely fabricated from this product. Hardware specialties such as door butts, knobs, hinges, etc; electrical supplies such as push-button plates, sockets, etc.; and electric fans, percolators, toasters and irons also require attractive tonnages of cold-rolled strip annually.

New capacity built or projected in 1923 is in keeping with the broadening uses of these finished steel products. Hot sheet mills numbering 49 were installed during the past year which compares with 18 in 1922, 59 in 1921, 82 in 1920 and 22 in 1919. In cold sheet mills the addition in 1923 numbered 51 compared with 5 in 1922, 44 in 1921, 87 in 1920 and 1 in 1919. Expansion of the cold finishing capacity in the sheet industry during 1923 was the second greatest in the past ten years. This brings the total number of sheet mills in the country to 760 which represents an increase of something like 40 per cent in eight years.

The expansion of the strip steel industry has been notable and include two new hot mills and 38 cold units in 1923. In 1922, 14 cold strip mills were put in commission and in 1921, 41 units. During the past three years the strip industry has been expanded by six hot mills and 93 mills of the cold type. At the beginning of 1924 five cold strip mills were under construction. These additions make the number of hot strip mills in the United States, 33 and of cold strip mills 1108.

Steel Distribution in 1922 and 1923 Compared

	Consuming classifications	Distribution percentages for 1923	Distribution percentages for 1922	Gross tonnage distribution of companies reporting for 1923	Gross tonnage distribution of companies reporting, for 1922	Calculated gross tonnage distribution of all companies for 1923	Calculated gross tonnage distribution of all companies for 1922	Percentage of increase or decrease of consumption in 1923 compared with 1922
1.	Railroad buildings and bridges	2.42	1.66	544,485	269,064	742,100	378,530	+ 96.05
2.	Other buildings and bridges	13.35	11.84	3,010,709	1,913,583	4,093,800	2,700,820	+ 51.58
3.	Railroad track work	12.86	11.01	2,898,671	1,780,570	3,943,540	2,512,100	+ 56.98
4.	Street railways	1.48	1.11	333,070	178,668	453,850	252,070	+ 80.05
5.	Automotive vehicles	10.09	8.98	2,274,507	1,451,632	3,094,100	2,048,000	+ 51.08
6.	Railroad cars and locomotives	14.67	11.18	3,306,577	1,807,084	4,498,600	2,549,500	+ 70.63
7.	Oil, gas and water requirements	10.81	14.84	2,436,445	2,398,910	3,314,900	3,384,450	— 2.05
8.	Mining and lumbering	1.67	.....	241,622	.....	328,140	.....	.....
9.	Agricultural equipment	2.37	2.47	534,141	399,607	726,760	563,800	+ 28.90
10.	Metal containers	3.71	4.16	837,124	672,770	1,137,670	949,200	+ 19.85
11.	Shipbuilding	0.84	0.98	188,744	158,106	257,600	223,100	+ 15.46
12.	Machinery and hand tools	2.50	2.83	563,393	457,338	766,650	645,200	+ 18.82
13.	Exports	6.27	7.82	1,416,051	1,266,342	1,922,700	1,786,500	+ 7.62
14.	All other requirements	17.56	21.12	3,959,565	3,414,875	5,384,790	4,817,730	+ 11.77
	Totals	100.00	100.00	22,545,104	16,168,549	30,665,200	22,811,000	+ 34.43
	Total all railroad	30.78	24.84	6,935,653	4,016,786	9,437,235	5,667,000	+ 66.53

Has Industrial Capacity Been Overbuilt?

(*Concluded from Page 6*)

this which was reaching the market in the closing months of the year was unusually favorable and a rising tide of new construction seems to be under way.

On a numerical basis foundry units of the country in the two years of 1921 and 1922 inclusive showed a gain of 199 or 3.3 per cent. The total of this compilation in 1922 was 6181 compared with 5982 two years previously. Of this total, gray iron foundries constituted 73 per cent; malleable foundries about 4 per cent and steel foundries something over 6 per cent.

Steel foundry capacity in the 10 years from 1913 to 1922 inclusive increased at about the same ratio as steel ingots or 46.39 per cent. Curiously, steel foundry capacity in 1922 is less than in 1921 and 1920, this decline being due to the abandonment of some capacity built during the rapid expansion of electric steel foundries from 1917 to 1920. Some converter capacity also was dismantled. Total steel foundry capacity in gross tons from 1913 to 1922 inclusive is as follows: 1922, 2,581,785; 1921, 2,591,695; 1920, 2,708,285; 1919, 2,436,230; 1918, 2,133,820; 1917, 2,086,055; 1916, 1,998,193; 1915, 1,926,480; 1914, 1,763,180; 1913, 1,763,690.

The country's steel capacity undeniably has been abnormally increased during the past 10 years due to the demands of war. But at the same time the country has been advancing greatly in population, in wealth and in the more universal enjoyment of a standard of modern life which requiries an increasing power and diversity of industry to satisfy and to sustain. And steel is the base of modern civilization while industry which fashions, fabricates and transforms into the myriad articles of presentday necessity and convenience, is its workshop. Then, too, the war while it brought exotic growth to industry also pushed aside, for the time being, the forces of normal development. The world has been underconsuming steel for at least five or six years and this loss now seems to be in process of being made up.

The demand for steel, it may be safely said, rapidly is overtaking such abnormal expansion as has come to that industry since 1914.

At this process proceeds nearer and nearer to completion, an increasing stimulus to all industry promises to result. This general readjustment toward a position of balance has made considerable progress during the past five years which it is difficult accurately to appraise. Surely, a notable part of it has fallen within the year of 1923. A few years of business volume such as that just past would go far toward restoring a state of equilibrium. It is not safe, therefore, to pass judgment on the extent of excess capacity which may appear to exist today in any single field of productive industry. History has shown that in so great and growing an industrial country as the United States capacity invariably has had difficulty in keeping abreast with normal demand.

Receiver Is Named for the Thropp Furnaces

Joseph E. Thropp Co., Inc., Everett, Pa., which operates iron and coal mines, blast furnaces and coke ovens in Pennsylvania and Virginia has been placed in the hands of a receiver on petition of creditors. Judge Thomas F. Bailey has appointed Andrew S. Webb of Philadelphia, receiver for the company which lists assets at $2,400,000 and liabilities at $1,300,000 with quick assets of $675,000.

The company operates the Earlston furnace at Everett, Pa., and two stacks at Saxton, Pa., with a combined capacity of 175,000 tons of pig iron annually. It also operates 590 beehive coke ovens with an annual capacity of 200,000 net tons, and owns iron ore properties in Pennsylvania, West Virginia, and Michigan with an annual capacity of 50,000 tons of its active mines. A limestone quarry at Ashcom, Pa., also is operated with an annual capacity of 150,000 tons as well as coal mines in Pennsylvania with an annual capacity of 500,000 tons.

Inability to obtain additional working capital and the slump in the iron business were given as the cause of the receivership.

Merger Is Postponed

The prosposed merger of the Belfont Iron Works and the Kelly Nail & Iron Co. both of Ironton O., has been postponed to Jan. 30, Coles Peebles president of the former company announced following the meeting of the boards of directors of both companies Dec. 28. Final action on the consolidation is deferred until that time to permit the Belfont company to comply with a legal technicality, it was explained. As a result of the merger the Belfont company will surrender its charter and is obligated to give its stockholders 30 days notice of its contemplated action.

Railroad Avoids Scrap Selling Burden

New York, Dec. 31.—Details of its contract by which the McKinney Steel Co., Cleveland, handles practically the entire scrap tonnage of the New York Central railroad are given in an official statement issued by the latter. This statement follows:

"The New York Central railroad has been dissatisfied with its method of handling scrap materials. The road now maintains six scrap docks and has been sorting into about 50 classifications. Present facilities do not permit cutting miscellaneous scrap to sizes required by steel mills and it has been necessary to sell it to dealers who cut it to size and reload it for shipment to mills. The road has decided it could realize a greater return by a contract with some large consumer on its rails who could utilize most of the tonnage. After presenting the matter to several consumers the road has made a contract with the McKinney Steel Co.

"This provides for shipment to the company's yards the railroad's accumulation of miscellaneous scrap unsorted. The steel company sorts this and buys all steel scrap it can use. This covers about 90 per cent of the tonnage. The remainder, such as malleable and cast iron, will be sold by the railroad on competitive bids, as heretofore. The railroad will also continue to sell axles, wheels, tires, rails and similar items which do not require handling through scrap docks. The price to be paid by the McKinney Steel Co. is to be based on current quotations in the trade publications. The practice of buying finished products on a sliding scale based on the price of raw material reported in trade publications has prevailed among railroads and large commercial industries for a number of years and the sale of scrap on the same basis is sound business.

"The contract will enable the railroad company to close six scrap docks and reduce sorting into 20 classes instead of 50 classes. On a conservative estimate the railroad will effect a saving of about $250,000 per year."

The scrap docks to be discontinued are at West Albany, Oswego and East Buffalo, N. Y., Avis, Pa., Collinwood, O., and Elkhart, Ind. This will release for other work 275 to 300 men earning $196,000 per year.

Under the arrangement about 10,000 tons of scrap a month go to the McKinney Steel Co., which probably will buy about 90 per cent and prepare the remainder for the market, to be sold by the railroad in the regular way.

Puddlers' Rate Reduced

Puddlers' wages will be $13.13 a ton in January and February, a reduction from $13.38. The examination of sales sheets at Youngstown Dec. 28 disclosed an average price of bar iron of 2.35c per pound during November and December, compared with 2.40c, the previous average.

Engineering Progress Is Marked

Developments in Iron, Steel and Metalworking Industries Indicate Initiative and Originality of Engineering and Operating Staffs—Many New Problems Are Presented for Solution—Research Gains More Effective Support

JUDGED from any standard of comparison, 1923 stands out as the most important year of engineering progress in the iron, steel and metalworking industries since the end of the great war. The uncertainties which discouraged initiative in previous years were absent, permitting engineers and operating executives to proceed with confidence in working out problems of design, construction and practice.

In the blast furnace field, the most striking developments were in methods of operation rather than in changes in equipment. While it is true the capacities of a dozen or more stacks were expanded and their efficiency increased by replacing obsolete apparatus with modern labor-saving machinery, the most spectacular achievements were recorded in furnaces of recent construction and are credited to operating supervision of the highest order. Due to care in selecting ore, limestone and coke and to skill in handling the charge in the stack, many furnace operators were able to break all previous daily and monthly production records, using all-ore or ore-and-scrap. Developments during the year clearly indicate a trend toward a demand for coal and coke of lower ash content and the use of washed flux stone. The question of employing oxygen or oxygenated air in metallurgical operations has been revived during the year and investigations have been undertaken to determine the value of oxygen in blast furnace, open-hearth and bessemer practice. Steelmakers have continued their study of the possibility of improving combustion and increasing production in open-hearth furnaces through modifications in port design, but apparently no new conclusions have been drawn from the year's experience. Improvements have been made in the construction of electric furnaces. A 60-ton arc furnace and a 6-ton horizontal ring type induction furnace, both installed in 1923, mark new limits in capacities for these types.

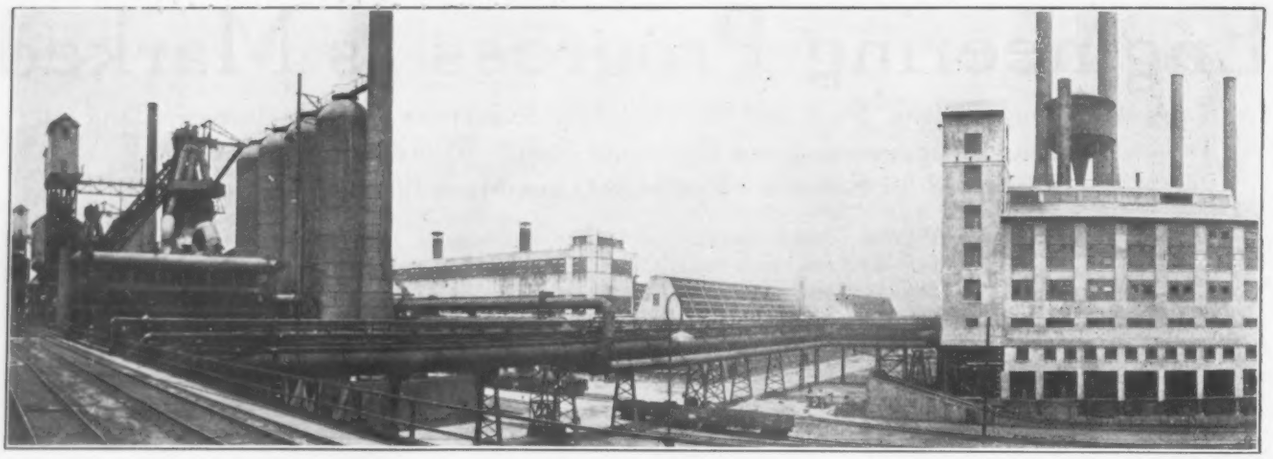
Progress in foundry practice is reflected by the adoption of specifications calling for castings of improved properties and by the interest manifested in international agreements on pig iron analyses and in the adoption of an international test bar for gray iron. Refractories manufacturers have attempted to classify service conditions for firebrick and are directing attention to the production of brick of greater uniformity. Several investigators have taken up the problem of determining the cause of the expansion and deterioration of blast furnace lining brick.

One of the interesting developments of 1923 is the decision to use high-pressure steam for large turbines. In one plant a mercury boiler is being operated successfully. The use of pressures of 1200 pounds per square inch presented a real problem to builders of boilers, who met the situation by using a shell forged to the desired size from a pierced billet. The practice of piercing large billets and expanding them on a mandrel under a press or hammer is gaining favor in making containers to withstand high pressures.

Due to the surprising stability of the automobile industry, the sheet and strip steel rolling capacity continues to grow rapidly. In many of the new mills, heating and annealing furnaces of improved design are being installed to enable the producers to meet the demand for sheets and strip of higher quality. Automatic furnace chargers and other labor-saving devices, as well as pyrometer control and similar refinements, now virtually constitute standard equipment in new mills. A plant designed for producing puddled iron by a mechanical process and a sheet mill in which continuous rolling will be adopted are nearing completion. Steady progress is being made in forming and machining metals. In the pressed steel industry, manufacturers are reaching out in new fields in the hope of applying stampings to other industries as they have in the automobile industry. This activity is leading to a more general practice of assembling articles from pressed steel parts and involves welding, brazing, riveting and other fabricating operations. Welding is gaining ground, it now being used as a production method more widely than heretofore. Standardization of machine shop practice is being urged by several influential organizations. Engineers and builders and users of machine tools are demanding more information as to the efficiency of cutting tools, cooling compounds, etc. More recognition of the advantage of coking coal in by-product ovens is indicated by the unusually large number of contracts for ovens placed in 1923.

BESSEMER CONVERTER AT NIGHT

An example of unusually good photography applied to a familiar steelworks scene. See page 20



A number of blast furnaces exceeded previous production records during 1923. The above illustration shows the two modern stacks of the Ford Motor Co. at River Rouge

Ironmakers Break Production Records

By RALPH HAYES SWEETSER

PROMISES of progress in blast furnace practice in 1923 were more than fulfilled. The tendencies toward greater production per stack and toward a greater output per man were carried forward throughout the year with results far beyond the expectations of a year ago. New tonnage records were established for the industry as a whole and for individual blast furnaces.

Last May, with 322 furnaces in blast, the rate of production was 45,000,000 tons of pig iron per year. The total production for the year was about 40,000,000 tons, the greatest amount ever made in one year, 39,400,000 tons in 1916 being the previous high record. Many individual blast furnaces exceeded all their tonnage records for a day and for a month. Besides breaking tonnage records a number of blast furnace customs and traditions were eliminated, and new standards were set up. The necessity of greater output per stack influenced blast furnace managers to cut out every wasteful material and practice around the blast furnaces.

From the beginning of lake ore shipments down to the year 1916, when the Lake Superior region produced over 65,000,000 tons of iron ore, the percentage of iron in the ores as shipped had decreased gradually to 51.20 per cent. The tendency since that year has been slightly upward, reaching 52.07 per cent in 1921. The average for 1922, according to Crowell and Murray in "The Iron Ores of Lake Superior" was 51.87 per cent.

Although new high tonnage records have been made by blast furnaces using an all-ore mixture, the practice of using iron and steel scrap increased until the prices of scrap suitable for blast furnaces began to approach the value of pig iron itself. One of the inconsistencies of the industry was the rapidly increasing price of iron and steel scrap.

Increased production per furnace stack calls for reduced slag volume and a better grade of limestone flux. To meet this requirement, the practice of washing flux stone has been introduced into some quarries with very satisfactory results. Uniformity in size and composition of flux stone will help much toward the smooth working of the blast furnace.

One of the traditions dropped from blast furnace practice this past year was the 12 per cent ash standard for coke. One of the worst features of this standard was that the ash generally was more than 12 per cent.

Blast furnace men are demanding and are getting coke with lower ash and lower sulphur contents The "base coke" adopted by the Southern Ohio Pig Iron & Coke association in 1920 contains 89 per cent fixed carbon. The coal for making such coke in by-product ovens must contain less than 7 per cent ash. The indiscriminate use of high-ash coals for making blast furnace coke has caused much furnace trouble and much high-cost pig iron. Pig iron manufacturers have used common sense in leaving much low-grade iron ore in the ground until the time comes when the state of the art permits its profitable use. They now are going to use the same common sense in regard to low-grade coal, and it will be left in the ground as far as iron men are concerned. The blast furnace men found out that it did not pay to ship iron ores with excessive silica or excessive moisture all the way from the Mesabi range to lower lake ports and thence by rail to interior furnaces. Such ores, low-grade, by nature, are now being beneficiated by washing, drying, or by magnetic concentration, followed by sintering.

The iron men are now applying some of the methods and customs of the lake ore trade to their own coal requirements. The freight on high ash in coal from the coal mines to the furnaces is often higher than the freight on excess moisture or excess silica from the ore mines to the same furnaces.

Some blast furnace men are demanding lower sulphur contents in their coke. The tendency is toward a standard considerably below 1.00 per cent. The old Connellsville standard of 12 per cent ash and 1 per cent sulphur is passing away in favor of the lower percentage of by-product coke.

The increasing use of machinery, not only for handling materials, but also for many of the furnace operations, has greatly reduced the number of men necessary to operate a blast furnace and consequently increased the output per man-day. Each successive increase in tonnage added still more to the output per man. The practice of having men for emergencies is passing away because of increasing use of oxygen for opening the iron notch and for cutting out tuyeres or cinder notches that have "ironed up."

Mr. Wang in his paper read before the American Iron and Steel institute, Oct. 25, 1923, said, "the number of man-hours at the Yangtze blast furnace is on an average about 17 as against 1.72 and 6.2 in the United States." At the present time it would be hard to give a fair average number of man-hours per ton of pig on account of the adjustments brought about by the three-shift day, but at a large modern furnace it is probably less than two.

The blast furnace was the last department of the steel industry to adopt

The author is assistant to vice president, American Rolling Mill Co., Columbus, O., and vice president, Portsmouth By-Product Coke Co.

the three-shift day. Many rolling mills, open hearths ,and coke ovens were already operated on the three-shift plan. The change from the two-shift day at blast furnaces came at a time when production was at a high rate and at a time when there were apparently only a few unemployed men. The three-shift day at blast furnaces now is the general rule, but the details of its operation differ a great deal according to the conditions that prevailed under the two-shift plan. It is too early to determine the effects on the men, on the output, and on the costs.

Notable work has been done by the bureau of mines during the past year in the investigation of the reactions inside the iron blast furnace. Most of this work was done with the experimental blast furnace at the station in Minneapolis where many observations have been recorded. Tests have also been made at various furnace plants, especially in reference to the analysis of the gases inside the hearth at the tuyere level. The important discoveries of Kinney, Perrott, Joseph and Royster have added much to the art of making pig iron. These men have almost, but not quite, solved the problem of coke "combustibility." It still requires that some one should formulate a rule for the "rate of flow" of the coke through the zone of coke combustion that now appears to be confined to a comparatively restricted volume in front of the tuyeres.

Research Work Valuable

The use of oxygen for enriching the air blast has not yet been satisfactorily investigated, although much preliminary conference work was done this past year. The use of oxygen in the blast will be one of the big problems for consideration during 1924.

One of the facts brought out by the research work of 1923 is the rapidity of reactions inside the blast furnace. Some of the technical men think that this may lead to important changes in blast-furnace construction.

The remarkable performance of the blast furnace of the Trumbull-Cliffs Furnace Co., Warren, O., in March and again in November has established new world records for tonnage produced from an all-ore mixture and for a mixture with considerable scrap. Some details of the record for November are given on page 1533 of the Dec. 6 issue of IRON TRADE REVIEW. David T. Croxton has kindly furnished the following additional data as to the materials. The November output was 25,203 tons of pig iron, an average of 840 tons per day, all of it under 0.05 per cent sulphur. The ore contained 52.6 per cent iron and only 6.41 per cent silica, and 0.84 per cent alumina, with 1.87 per cent lime; the coke averaged 87.70 per cent fixed carbon, 11.25 per cent ash and 0.90 per cent sulphur; the limestone had 2.89 per cent silica, 2.58 per cent alumina, 51.50 per cent lime and 0.84 per cent magnesia. The coke per ton of pig iron was 1970 pounds (beehive coke) and the flue dust made was 233 pounds per ton of pig iron. These figures are rather high, but are probably balanced by the enormous production.

Interest Centers on Rolling Practice

DURING the past 12 months steelworks and rolling mill engineers have been more active in trying out new designs and methods than in any corresponding period since the war. Although a number of radical departures from conventional practice have been tried and proved worthy, a great many more are in the experimental stage and their value still is to be demonstrated.

In considering the engineering features of steel plant operation, extending from the open hearth or bessemer to the delivery of the rolled product from the final pass, the critical observer is led to believe that in 1923 less attention was paid to the making of steel and more to the rolling of the metal than in any recent year. This is explained partially at least by the fact that the large number of new mills erected during the year, in contrast to the few open hearths, has afforded rolling mill engineers a golden opportunity to demonstrate new ideas of design and construction.

A year ago, in commenting in these columns on the status of the so-called blow-pipe principle in open-hearth construction, it was stated that many operators were finding it difficult to interpret satisfactorily the claims of increased output and decreased fuel consumption for furnaces of that type. It was said that experience had not yet proved that these advantages overweighed the need of tighter brickwork, a higher standard of intelligence in supervision and more skilled operators. Developments during the past year do not seem to have answered this question.

Investigation by a committee sponsored by the United States bureau of mines on the use of oxygen or oxygenated air in metallurgical processes is receiving much attention. Members of the committee believe that with the substitution of oxygen for air in the last part of the process, steel of electric furnace quality can be made in the open hearth; that the application of oxygen for combustion, with an idea of substituting cheaper fuel for expensive fuel, is promising, and that the substitution of oxygen for the iron ore used as an oxidizing agent will not only give a higher grade product but will decrease the time required for the process by about three hours. The gains are dependent in part on the use of refractories that will withstand higher furnace temperatures. The six-way reversing valve, referred to in last year's review as a new development for controlling the gases in open-hearth and soaking pit operation, has been installed in a number of plants during the past year. Although but few electric furnaces were installed,

AN UNUSUAL VIEW OF THE INTERIOR OF AN OPEN-HEARTH FURNACE SHOWING MOLTEN METAL

considerable work has been done in improving existing designs. The heroult-type furnace has been improved and now is mounted on rockers. The electrodes are grouped closer together and while the mast on the back of the furnace is lower, it has a greater electrode lift, permitting the electrodes to be lifted completely out of the furnace. The transformer capacity has been increased so that a wide range of secondary voltages may be used in connection with dual voltage control. This permits the use of any two voltages.

In the application of electric drive to rolling mills, the use of high speed motors with reduction gear sets has been even more noticeable than in previous years. Motors for continuous hot strip mills and reels, involving several unusual features of control, were installed in 1923. Progress in the design of electrical equipment in the metalworking industry is summarized in greater detail on page 24.

Perhaps the greatest strides made during the year in rolling mill practice have been in connection with sheet and strip mills. The increased attention can be attributed to the influence of automobile builders, who constantly are seeking material of higher quality. The practice of "loose" rolling continues to gain favor among sheet producers in spite of its disadvantages from a tonnage standpoint.

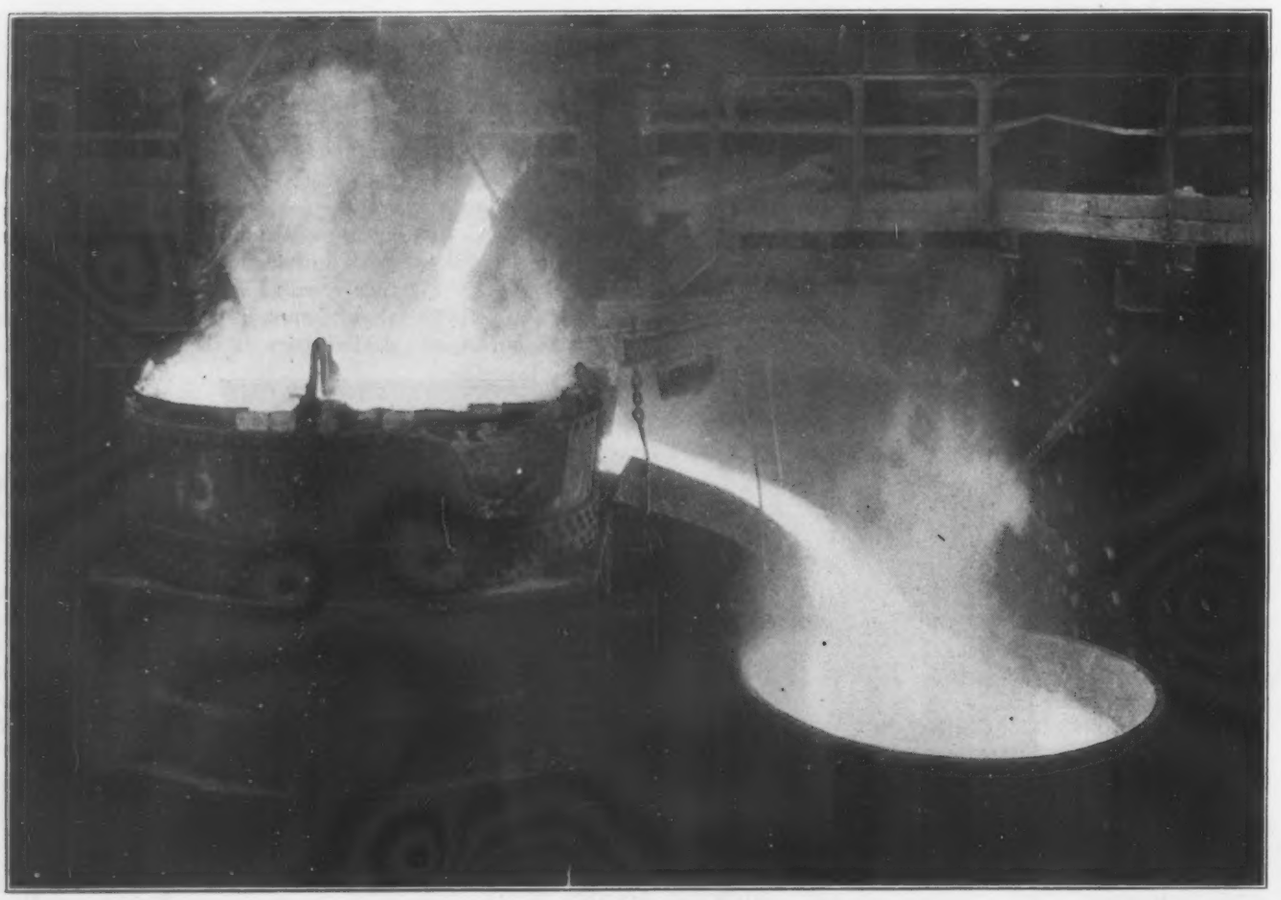
In strip mill design another step has been taken in solving the problem of controling the speed of finishing rolls. Each stand is driven by a separate motor, which is designed with such sensitive inherent speed regulation that no special or auxiliary speed control device is required.

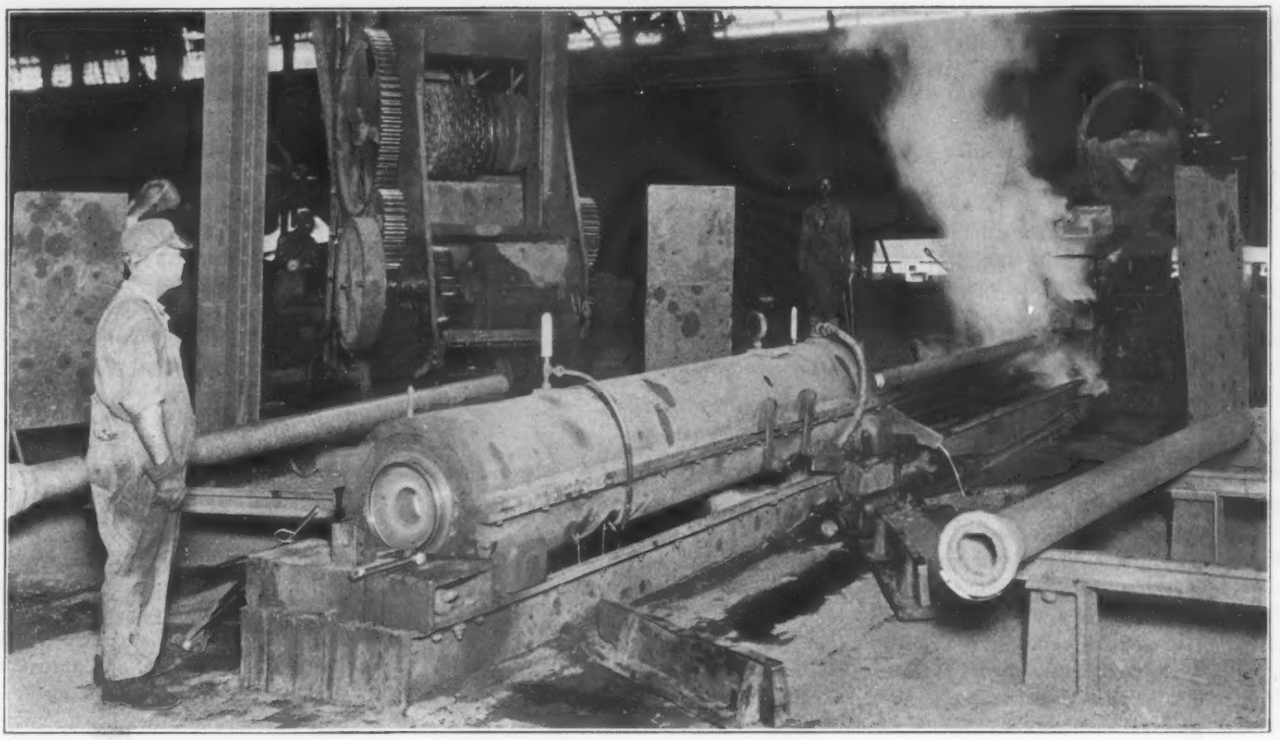
An interesting method of heating the finishing rolls of sheet mills has been in operation at the plant of the Inland Steel Co. Electric space heaters are applied to the rolls before each run and records show that the preheating assists appreciably in reducing the production losses which usually attend the warming-up process and in minimizing roll breakage. The cost of heating is said to be reasonable.

Two unique installations were laid down in this country during 1923 and while details of construction are withheld at the moment, operating results are awaited with interest. One of the installations has to do with the making of puddled iron mechanically by an entirely new process, patents of which are held by E. L. Ford, Youngstown, O. The company, known as the American Puddled Iron Co., own 418 acres of land at Warren, O., upon which the plant now is nearing the final stages of completion. Approximately 250 tons of muck bar and semifinished material will be made per 24 hours when operations begin early this month. The other installation in question, around which considerable interest centers, is the new sheet mill layout of the American Rolling Mill Co., at Ashland, Ky. The mills are arranged for the continuous rolling of steel sheets and, according to most recent advice, success in this direction has been attained by employing hollow rolls and maintaining them at the proper temperature by electric current during the rolling process.

Photographing Beauty of Molten Steel

PERHAPS no phase of manufacturing is more spectacular than that of steelmaking, and for that reason photographers for many years have tried to obtain prints that truly represent steelworks scenes. Three photographs, reproduced in this issue of IRON TRADE REVIEW, *are remarkable for their faithful portrayal of the appearance of hot metal. The illustration below, and that appearing on page* 17 *are from prints made by W. A. Bartz, photographer for the Youngstown Sheet & Tube Co. The reproduction of an open-hearth interior, on page* 19, *is from a photograph made by R. J. Waters & Co., San Francisco.*





Extension of the use of the centrifugal process for making cast iron pipe was one of the important developments of 1923. One company has 20 machines in operation

Foundry Standards Advanced in 1923

BY H. E. DILLER

PROGRESS during 1923 in the foundry industry consisted not only of improvements in methods and equipment but also in marked advances in the work of formulating specifications and establishing standards. The trip of American foundrymen to Europe and the international congress at Paris are factors indirectly contributing to greater recognition on the part of foundrymen of the need of international agreements on specifications and standards.

Perhaps the most radical developments in foundry practice have come from Germany where so-called "pearlitic" cast iron and a cupola using preheated air have been announced. Pearlitic cast iron is the result of casting low silicon iron in a preheated mold and cooling it slowly. The pearlitic structure thus secured is said to increase the strength of the iron slightly and to make it more resistant to shock than normal gray iron.

Heating the air for the cupola by regeneration and passing it horizontally through the melting zone instead of vertically up the stack is said to have proved satisfactory in Germany for melting iron. The process also is claimed to effect a saving in coke. The performance of a cupola of this type, which is being tried out by the Griffin Wheel Co., Chicago, is being watched with interest by American foundrymen.

During the year the electric furnace, which has obtained only a limited hold in the gray iron foundry field, advanced its prestige when a piston ring manufacturer decided to install two electric furnaces to melt iron in its new foundry.

The use of the DeLavaud process of casting iron pipe centrifugally has been extended during the year by its adoption by one American firm which now has 20 casting machines in service. Another southern firm also has begun the installation of some of these machines.

An unusual amount of attention has been given to improving core ovens in steel and gray iron foundries. Closer control of heat has been accomplished in some of the newer types of oil, gas and coal or coke fired units. Electrically-heated core ovens continue to be installed, the tendency being toward the design of larger ovens. A motor driven winch for moving cars in car-type ovens, which does away with the use of a crane and snatch block, is one of the year's developments.

In steel foundry practice a tendency to increase the proportion of castings made by the green sand process over those made in dry sand molds has been noted during the past year. Advances also have been made in producing heavy steel castings in cores instead of in molds. The American Society for Testing Materials recognized the strides being made in steel foundry metallurgy by adopting as tentative, revisions to its former specification for carbon steel castings. The revised specification calls for a higher tensile strength and elongation and an increase from 0.30 to 0.40 per cent in the carbon limit on castings not requiring physical test.

The important research on molding sand has been continued during the year, the joint committee of the American Foundrymen's association and the American Society for Testing Materials having reported methods for determining the bonding strength and the permeability of molding sands.

A revival of interest in the manufacture of malleable iron in Europe is indicated by the forming of an association of European malleable foundries. This organization, which was effected during the international foundrymen's congress at Paris, proposes to raise the standard of malleable iron castings through controlling their manufacture, improving methods and for-

The author is metallurgical editor of *The Foundry*, Cleveland.

mulating specifications. Its activities are expected to closely parallel those of the American Malleable Castings association.

Specifications and standardization received a decided impulse from a number of sources. The Institute of British Foundrymen adopted a specification for gray iron castings requiring the tensile strength in the 1.25-inch diameter bar of 20,160 pounds per square inch for grade *B* castings and 24,640 per square inch for grade *A* castings. An effort was made at the international foundrymen's convention held at Paris in September to establish a number of international standards. The American delegation proposed specifications for pig iron but no tangible results were obtained. Representatives of the leading producers in France and Belgium and a number of British producers agreed in principle to selling iron by analysis but agreement on suitable limits was not obtained. The subject of an international test bar also was brought forward at the Paris meeting. It was decided that immediate steps should be taken to determine methods of testing the quality of the iron and of the castings themselves. A resolution was adopted recommending the appointment of a joint committee representing the interested nations to work toward carrying the proposal into effect. Since the time of the international congress the matter has been held in abeyance and it now rests with the foundry associations of each country to take the initiative in starting active work.

Research on Refractories Is Progressing

BY ROBERT E. FERGUSON

THE outstanding development in the refractories industry during the past year has been the classification of service conditions. In the past, failures frequently have resulted from putting the right brick in the wrong place. The purchaser, for instance, often declared that his operating temperatures were high and the load slight, but failed to take into consideration the pressure of a corrosive slag or severe temperature fluctuations. Attempts also were made by purchasers to write specifications for an all-purpose brick with the result that an "ideal brick" was described. Unfortunately it often happens that in order to develop one good quality another must be sacrificed; consequently, the "ideal brick" was more frequently described than obtained. In many cases, if the purchaser had analyzed his furnace conditions, he would have found that one or more of the factors which shorten the life of a firebrick was negligible in certain installations and important in others. It was to remedy this state of affairs that the American Society for Testing Materials devised the service classification which is shown graphically in the accompanying illustration. The classification is based on the assumption that there are five major destructive agencies—temperature, load, abrasion, slag action and spalling—and that these may all exist to an important, moderate, or unimportant degree. Any possible combination of these five factors can be designated by prefixing the letters *H*, *M*, or *L* (which stand for temperature) to the proper number. Thus, an operator can classify his furnace conditions and when the terms "important" and "unimportant" are defined, this classification becomes quite definite. For example, a certain furnace condition might be stated to be *M*-61. By referring to the chart it will be seen that this means that the temperature is moderate, load and slag action both are important, and abrasion and spalling both are unimportant. On the other hand the brick manufacturer will classify his various brands in the same way and attempt to supply for each set of conditions the product best suited to withstand them. The black squares represent the extreme conditions and are naturally the ones which deserve the most study. The white squares represent conditions where at least one factor is moderate. Whether all the combinations which are mathematically possible occur in practice remains to be seen. An application of these service classifications when fully worked out should result in a widespread benefit to all users of refractories. The only new raw material of importance that has been introduced to refractories manufacturers during 1923 has been the bauxitic clays of central Georgia. Many of these clays have a softening point of cone 36 (approximately 3360 degrees Fahr), that is, 100 degrees higher than the best quality Pennsylvania flint clays. Burning is accompanied by a large shrinkage, a feature which differentiates these clays from their better known rivals.

Service Classification of Refractories		Load Unimportant			Load Moderate			Load Important		
		Abrasion Unimportant	Abrasion Moderate	Abrasion Important	Abrasion Unimportant	Abrasion Moderate	Abrasion Important	Abrasion Unimportant	Abrasion Moderate	Abrasion Important
Slag Action Unimportant	Spalling Unimportant	1	2	3	4	5	6	7	8	9
	Spalling Moderate	10	11	12	13	14	15	16	17	18
	Spalling Important	19	20	21	22	23	24	25	26	27
Slag Action Moderate	Spalling Unimportant	28	29	30	31	32	33	34	35	36
	Spalling Moderate	37	38	39	40	41	42	43	44	45
	Spalling Important	46	47	48	49	50	51	52	53	54
Slag Action Important	Spalling Unimportant	55	56	57	58	59	60	61	62	63
	Spalling Moderate	64	65	66	67	68	69	70	71	72
	Spalling Important	73	74	75	76	77	78	79	80	81

CLASSIFICATION OF SERVICE CONDITIONS

H = high temperature; M= moderate temperature; L = low temperature. Example: M—21 indicates modern temperature, unimportant load, unimportant slag action; abrasion and spalling both being important

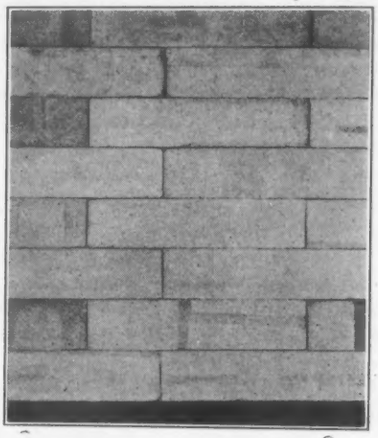
The author is industrial fellow, Refractories Manufacturers' Association fellowship, Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh.

On account of this high shrinkage considerable development work must be done in order to learn how to handle them. The deposits have been thoroughly explored by the United States bureau of mines and are being exploited by southern business interests. There is no doubt that these clays eventually will find considerable use in commercial refractories, thus helping to conserve the waning supplies of flint clay from the older Pennsylvania and Kentucky fields.

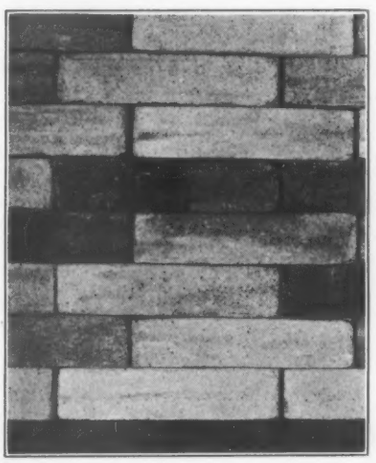
The year 1923 has been marked by many forward steps in the technical control in the refractories industry. The total production for the year was 1,050,000,000 9-inch equivalents. Of these, 879,000,000 were fire clay and the rest nearly all silica. This enormous production, however, represents an average of only 78 per cent of the capacity for the industry for the entire year.

One problem that has been given special attention during the last 12 months has been burning practice. Cooperative studies have been undertaken on a large scale by the United States bureau of mines and the manufacturers. The government laboratory car has been backed into the sidings of representative brick yards, and for a month or so at each yard experts have made gas analyses, temperature measurements, draft determinations and other interesting observations. The interest of the bureau of mines lay in fuel conservation, while the manufacturers have been primarily interested in more thorough and more uniform burns.

Users lately have showed a preference for hard burned brick. They are learning that hard burned brick will not shrink in service and will resist abrasion to a greater degree. Nevertheless, some consumers handicap themselves by condemning a brick solely on the color or the prominence of iron spots. As a matter of fact, the color of a brick can be greatly changed by the kiln fireman piling the coal in the front of the firebox instead of throwing it back on the grate. The number of iron spots differ if the mud is loosened from the molds by bumping the molds on the ends instead of on the bottom. It will be seen, therefore, how little color serves to indicate the quality of the brick or the nature of the original clay.



THAT refractories manufacturers are working toward greater uniformity in firebrick is indicated by the accompanying illustrations. The bricks shown below were made in the usual way while those pictured above, which lie closely together, were produced by an improved process.



During the past year there has been an increasing demand for brick of greater uniformity in respect to size and quality. This is justifiable if reasonable, but in some instances uniformity has been overemphasized. There are so many factors affecting the size of a finished brick that only at a cost that would be prohibitive could they all be controlled. Nevertheless, steps are being taken to improve matters in this respect. Soft mud machines are in many places supplanting hand molders. These machines throw the mud into the molds with the same vim at quitting time that they had in the morning and have no individual preferences as to the size of the grind or the amount of water in the mix. But the most uniform brick are those made by the dry press process. However, they are rather dense and for this reason cannot be used for some purposes. In the past this method of manufacture has been confined to soft clays for low heat duty brick, but in view of the amount of development work that has been done in the last 18 months it is reasonable to expect brick of this type having a wide range of refractoriness to be placed on the market in the near future.

Fortunately, conditions are improving and many large users of refractories are employing ceramists and equipping testing laboratories to guide them in filling their requirements.

Seek Standardization in Crane Design

BY LEONARD P. EGAN

WHILE electric cranes have been most important in the development of the iron, steel and metalworking industries, probably no equipment has been more abused. Not long ago, a crane trolley consisted of a skeleton frame work with a railway motor or two hung on to it. Later each manufacturer developed cranes according to his own idea of design, with the result that each model was different in arrangement, weight and appearance. At that time cranes were considered necessary evils; little attention was given to their application and no regard was given to the service for which they were installed. In steel mills the upkeep costs became almost prohibitive, the spare part situation was almost intolerable and the accidents resulting from crane operation amounted to more than those from all other branches of equipment. As a result of these conditions, the mill type electric crane was developed to better meet requirements.

The mill type crane now is coming into more general use and gradually is supplanting what is known as the industrial crane or shop crane. It was developed by steel mill electrical engineers in the larger plants and is the result of many years of study. Formerly it was built to a rigid set of specifications. By comparison and by interchange of information engineers have worked toward uniformity in the specifications, although there still is considerable differ-

The author is special engineer, Ohio Steel Foundry Co., Lima, O.

ence in detail. The arrangeement of the machinery on the crane, particularly the trolley, type of bearings, the radical change in track wheel applications, the arrangement of the shafting, etc., was incorporated in the resultant cranes because of the urgent need for quick repair, safety and ability to withstand heavy, 24-hour service. In this development the influence of the repair man probably was greater than that of the chief engineer. Every shaft, gear, track wheel, and bearing was carefully arranged so that it could be quickly removed for replacement. This increased the weight and first cost of the crane but resulted in longer life and lower maintenance costs. Simplicity with safety was the keynote. Specifications adopted by the Association of Iron and Steel Electrical Engineers cover this type of crane.

Safety Requirements Rigid

There have been no radical changes in the design of cranes during the past year except that more rigid safety requirements and more rugged construction have been sought. There is a well defined movement toward safety devices arranged so that the part of the crane where they are applied will not operate without them. The combined rail sweep, oil cellars and spring bumper in one casting, which is in use on the bridges of a number of mill cranes, is typical of this movement.

The use of safety cables in addition to the operating cables on the main hoists of ladle cranes always has been the subject of considerable discussion. A large number of ladle cranes now in use are equipped in this manner. In spite of the arguments of those who object to safety cables, those who use them consider them a good investment and there is a possibility their use may become compulsory in the future.

It is believed the ultimate size and capacity of ladle cranes for general steel plant use has been reached. Not long ago a 75-ton crane was considered as the maximum, but changes in open-hearth furnace design and increased efficiency in steelworks gradually caused crane makers to increase the capacity of ladle cranes first to 100 tons, then to 125, 150 and recently to 175 tons. Present furnace design and the problem of providing suitable runways seem to limit the size to 175 tons.

During the past year or two a departure in trolley frame arrangement has been introduced. The two trolley side frames, together with the machinery girt or strut are in one piece, making the entire trolley framework one casting. The idea in this design is to eliminate the bolts and rivets that are used to fasten the machinery girts and lifting beams to the side frames. About 15 cranes having trolleys of this type have been built with trolley spaces of from 9 to 14 feet. One of the large steel foundries has a number of single casting trolleys of up to 50 tons capacity in operation, but the trolley span is of only 6 feet. There also are a number of small, short span cranes in operation equipped with single casting trolley frames of narrow span. This type of trolley is known as the "turtle back." Without doubt there is a field for this type of trolley frame construction but the well designed mill type trolley doubtless will hold a strong position among users of traveling cranes for years to come.

Alloy Steel Finds Favor

Crane manufacturers have discussed the feasibility of substituting heat treated alloy steel shafting for ordinary open-hearth steel. The use of vanadium steel in the end carriages and side frames is favored by many because of the ability of this material to withstand prolonged vibration and fatigue. Heat treated pinions now are in general use and treated gears are receiving more consideration daily. A definite movement is noticeable in the larger foundries toward the gradual elimination of old cranes which usually are costly in upkeep and inefficient in operation. Heretofore in the purchase of cranes for general industrial use, it has been the practice to consider the crane as an entire unit. The decision to buy was governed almost entirely by the reputation of the builder and the price quoted. At the present time, service, safety, and cost of upkeep are the ruling factors in deciding upon the type of crane and first cost, although a factor, is of lesser importance. The problem has become one of economics. It now is a question of so many shafts, bearings, gears, drums, brakes, track wheel applications, etc., and assurance of continuous service. It is believed these are the factors that will govern the purchase of cranes in the near future.

Use Interchangeable Parts?

In the near future it will not be surprising if some of the large users or cranes develop a type in which the trolley and bridge end carriage will be of their own general design and arrangement. The design will be a composite of that of the mill type trolley built by three or four of the larger builders. The trolley side frames and bridge end carriage will be made from the same pattern and although the cranes may be built by different manufacturers they will be duplicates and the parts will be interchangeable in each crane regardless of the builder. The movement toward this standardization already has been started.

From all indications it appears that the crane business in the next year or two will consist largely of utility cranes in capacities of about 40 tons and under. A large portion of these will be for rehabilitation in old plants where light, poorly-designed cranes do not meet the 24-hour intensive service. Only a small percentage of the cranes will be of the larger, steel mill, special units.

The present activities of crane builders, combined with the economic needs of purchasers of cranes are encouraging the development of a more uniform type of crane. Cranes must have a higher degree of dependability and must do more work at a lower cost.

Electricity Gains in Metal Industries

ELECTRICITY'S firm position in the metalworking industries was further strengthened during 1923, manufacturers of electrical equipment having operated their plants at capacity to meet requirements. Progress in the application of electricity has been marked, especially in the field of industrial heating. The following summaries of developments in 1923 are taken from the reviews prepared by two important manufacturers of electrical equipment. The use of high-pressure steam for turbines and the automatic control of conveyor belt motors are interesting features.

Reflects Progress in 1923

By John Liston

DEVELOPMENTS during the year on large turbines consisted of refinement in mechanical details without radical changes in construction. The outstanding feature was the production of turbines for high steam conditions, one 4000-kilowatt turbine being designed for a pressure of 1000 to 1200 pounds and to exhaust into headers supplying other turbines at from 250 to 350 pounds. The solution of the problem of lower operating costs also is being approached in another way. The first commercial mercury boiler and turbine exhausting into a condenser which in turn generates

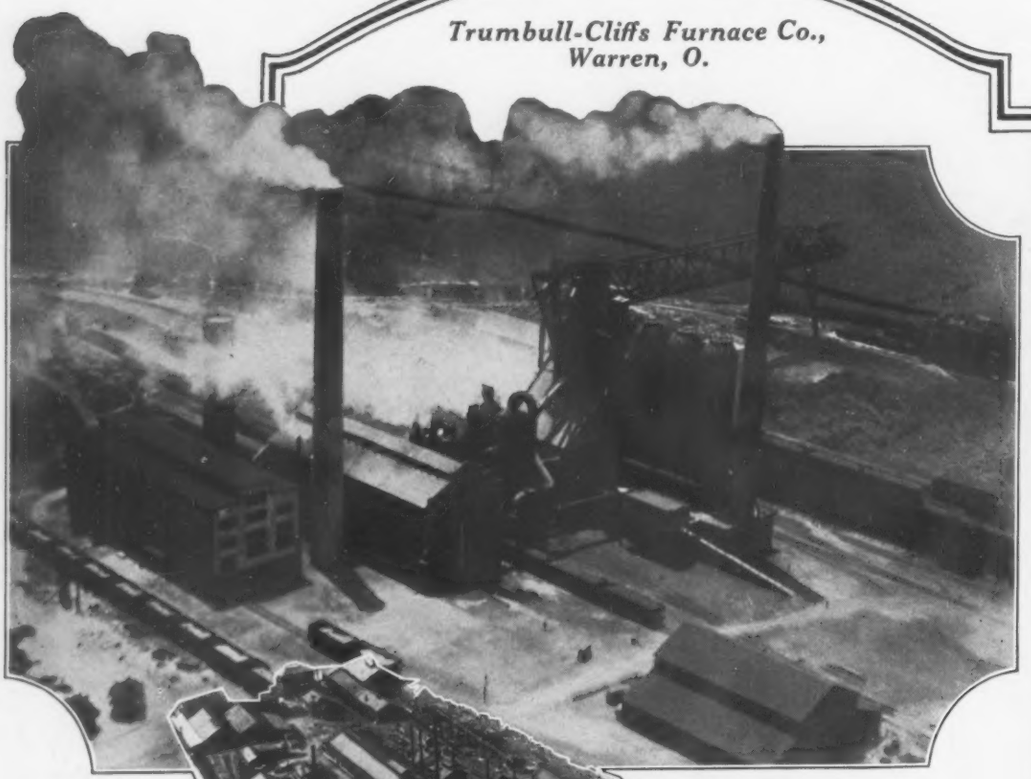
(*Continued on Page* 31)

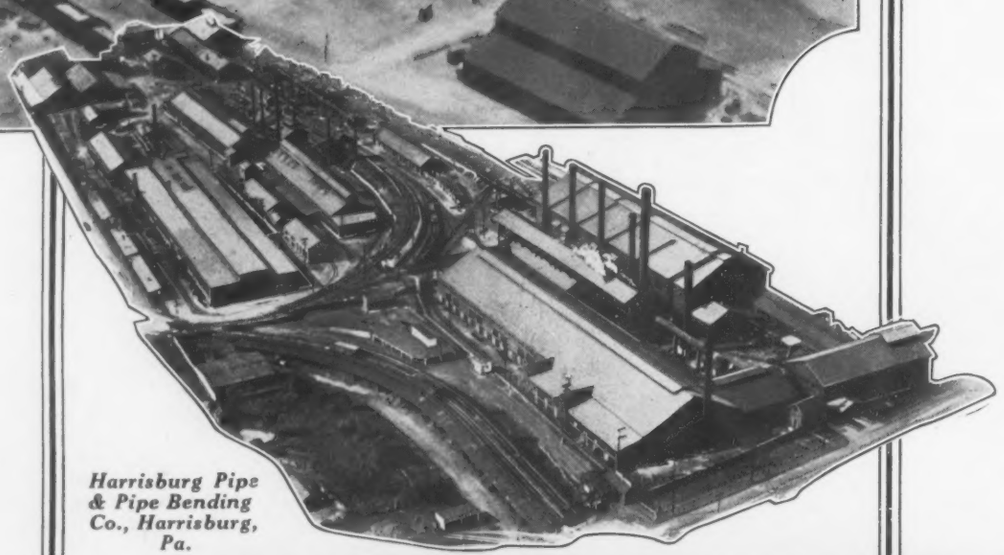
The author is with the General Electric Co., Schenectady, N. Y.

American Industry From the Air

Panorama of the Adirondack Mountains Showing Port Henry Blast Furnace Plant and Mineville Iron Ore Mines Marked By White Pyramids, Four Miles Distant by Air Line

Trumbull-Cliffs Furnace Co., Warren, O.

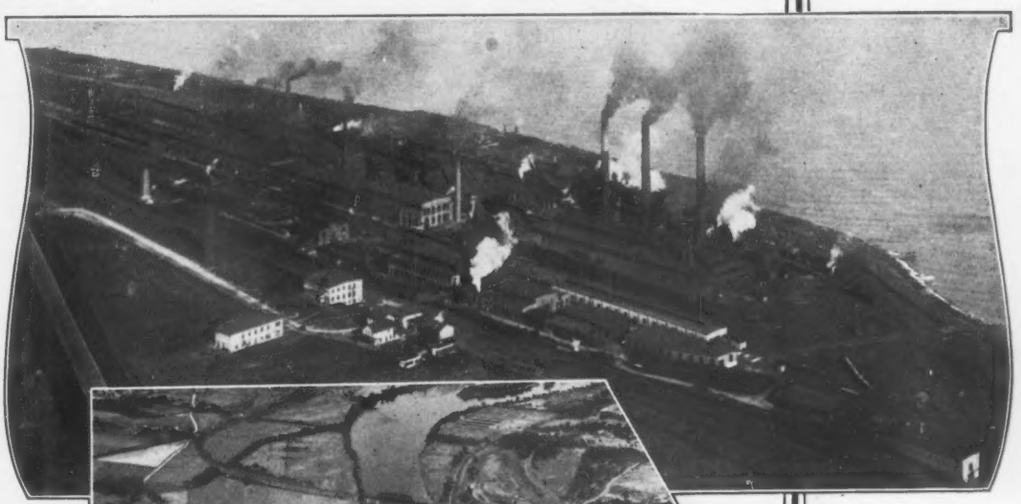




Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.

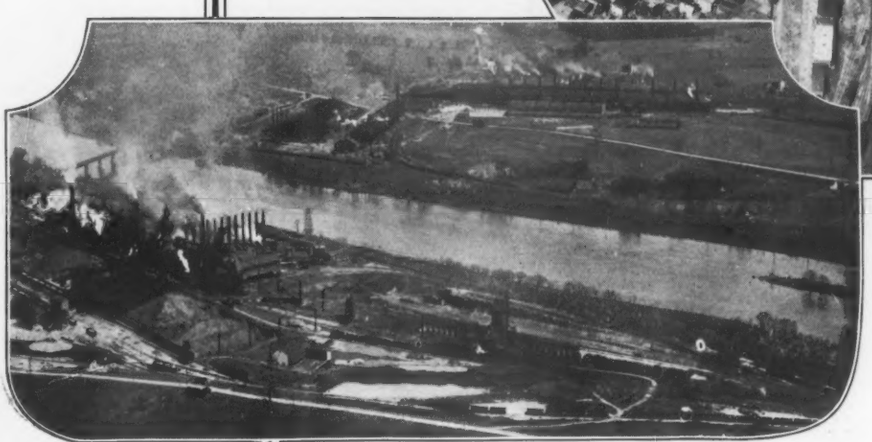
Ensley, Ala. Works, Tennessee Coal, Iron & Railroad Co.

American Steel & Wire Co., Waukegan, Ill.



Schenectady, N. Y. Works, American Locomotive Co.

©Fairchild Aerial Camera Corp.



Alan Wood Iron & Steel Co., Swedeland, Pa.

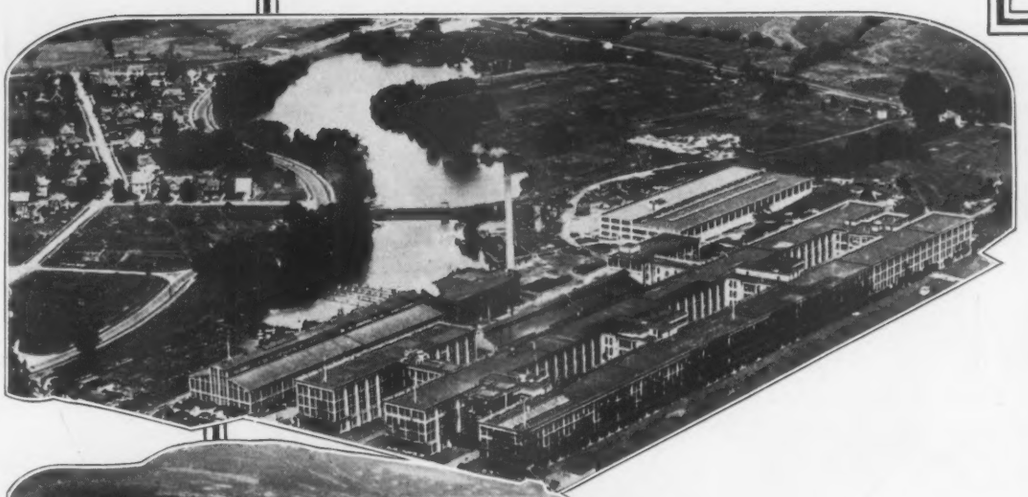
Schenectady, N. Y. Works, General Electric Co.

©Fairchild Aerial Camera Corp.

Mansfield Sheet & Tinplate Co., Mansfield, O.

Blast Furnaces, Republic Iron & Steel Co. Thomas, Ala.

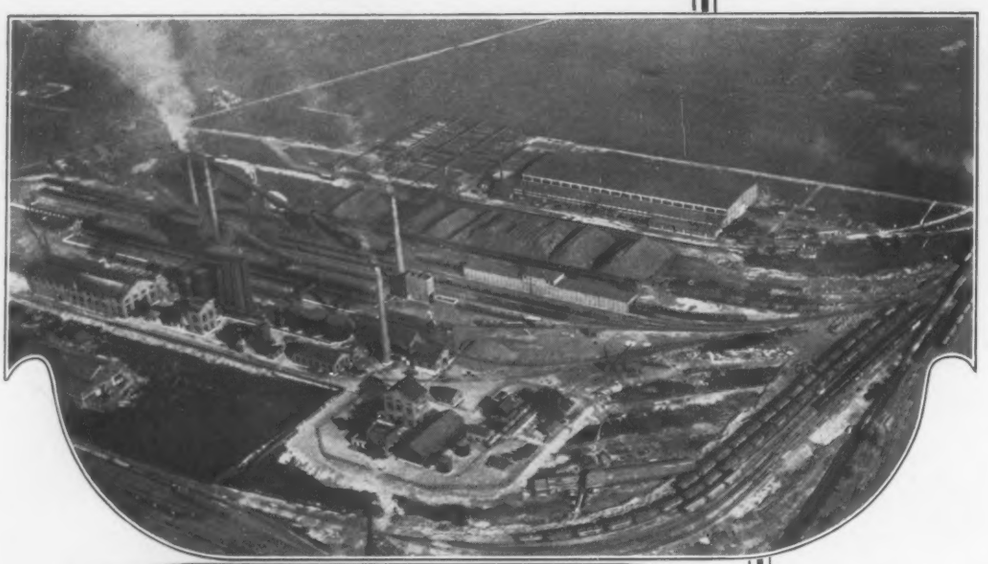
United Shoe Machinery Co.,
Beverly, Mass.



Baldwin Locomotive Works,
Eddystone, Pa.

New York Shipbuilding Co.
Camden, N. J.

Donner Steel Co., Inc.
Buffalo



East Side Works
American Rolling Mill Co.
Middletown, O.

Interstate Iron & Steel Co., Chicago

Electricity Gains

(*Continued from Page* 24)

steam for an existing steam station was placed in operation late in 1923.

A single phase motor for industrial use, which operates on the squirrel cage induction principle has been developed which eliminates entirely the short circuiting switches heretofore considered essential and permits simple construction. During the year considerable work has been done toward standardizing the bores of small high speed motors used in the woodworking industry.

The H. C. Frick Coke Co. is installing a belt conveyor about 5 miles long for transporting coal from the mines to a shipping station. It consists of 20 sections, each driven by an induction motor. The motors vary in size from 50 to 175 horsepower. Solenoid brakes are provided for stopping and holding the belts when power is cut off from the motors. The control is arranged so that the motors start in sequence, beginning at the delivery end. As each motor reaches full speed, it energizes the starting circuit of the next motor. If any motor stops, it automatically stops all motors preceding it but allows those following it to run and clear the belts of coal.

In steel mills the tendency toward the use of high speed motors with reduction gears, which has been quite marked for the last few years, continued to gain headway and over 90 per cent of the new motors are for geared drive. One of the important developments of the year was the building of alternating current brush shifting motors with shunt characteristics.

The largest horizontal ring-type induction furnace in the United States was built for installation at the plant of the Allegheny Steel Co. It has a maximum capacity of 6 tons and in normal service will melt three tons every three hours.

In the field of industrial heating, an electric furnace for the first time has been used successfully for the bright annealing of copper wire. Another special furnace has been developed for annealing steel punchings used for field and armature laminations.

Trend Toward Refinement in Design Marked

By H. W. Cope

CONSIDERABLE time has been spent on the study of a steam turbine for 1200 pounds steam pressure and final designs now are in progress. This will be a reducing turbine with an exhaust pressure of 300 pounds gage.

The largest ore transfer car was placed in service during the year. A "midget" storage battery locomotive for metal mines has been developed, and three quencher locomotives with special control have been built for steel mill use.

Among distinctive installations of electrical equipment for rolling mill drives made during the past year is the apparatus supplied for operating a 16-inch hot strip mill. The roughing stands of this mill are driven through herringbone gear units by two 1500-horsepower, 705 revolutions per minute induction motors with liquid slip regulator control. The four finishing stands are arranged to form a continuous train, each stand being driven by a separate compound-wound 240-volt direct current motor. Two of the motors are rated 1500-horsepower at 125 to 250 revolutions per minute and two are rated 1800 horsepower at 165 to 350 revolutions per minute. These motors are designed with such close inherent speed regulation that they operate throughout their range without any automatic speed regulating control. This is the first installation of a drive for a continuous hot strip mill train which has been operated without special control for maintaining correct speed. Power for the direct current motors is supplied by two synchronous motor generator sets each consisting of two 100-kilowatt 600-volt generators and a synchronous motor.

Electric heating is continuing to find favor in the industrial world for certain applications, one of which is electrically heated solder and babbitt pots. Solder and babbitt pots of 150 and 750-pound capacity have been developed with automatic temperature regulation. Here again temperature regulation applied to a soft metal melting pot of this character is a distinct step forward in the industry.

Important developments in the line of heat treating furnaces for the treatment of steel have been perfected.

The past year has witnessed the installation of the world's largest arc furnace.

The author is assistant director of engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Machinery Builders Improve Products

BY E. F. ROSS

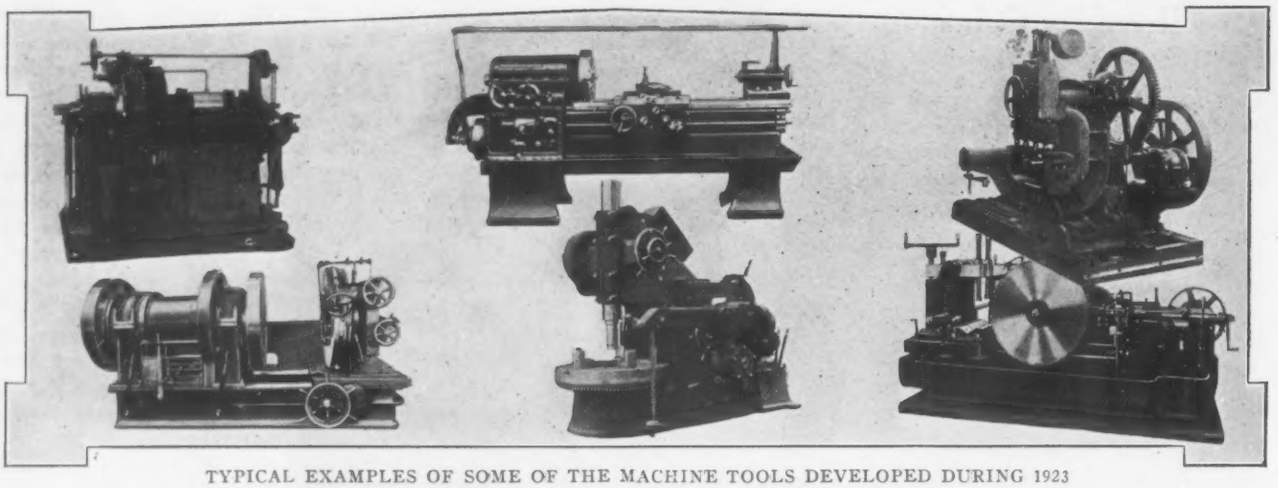
ALTHOUGH the production of machine tools during the past year has been nearly double that of 1922, the machine tool industry is closing another lean year. The overexpansion of manufacturing plants during the war still is exerting a restraining influence on purchases. Until this idle capacity has become absorbed and is placed in production, no great demand for additional equipment is anticipated.

During the early months of 1923, automobile interests were heavy purchasers of new tools, but as the plants were tuned up to record production levels additional sales, except for replacement purposes, were not forthcoming until the last quarter when production schedules for 1924 were started. Buying by the railroads promised to be an important factor as indicated by purchases during the latter part of 1922, but this business was somewhat below expectations. As a matter of fact, statistics collected by machine tool builders show that operations in 1923 were at a rate of between 45 and 50 per cent, whereas during the preceding year, the activity was only 25 per cent. The increase of 1923 was due practically altogether to domestic business because unsettled conditions of Europe and their accompanying effect upon trade, reduced European export business to a negligible factor.

In view of the fact that operations have been at a low level in 1923, tool builders have devoted much time and energy to the engineering development of their equipment. Old machines have been redesigned and modified and new machines have been perfected. Various needs of industry have been studied and an attempt made to fill those needs. This has been particularly true of the automotive industry where production is at a high rate and highly specialized.

For a time the trend of development was toward strictly single purpose machines, in other words, machines devoted to the production of one specific piece of work. In some industries machines of this type are highly desirable while in others they are less in favor because when they are out of operation even for a short period production is thrown out of balance quickly. The present tendency, therefore, is toward more standard units. These units may be standard machines simplified for single purpose use or may be single purpose machines equipped with attachments providing for a wider range of work.

Machines for specialized work tend toward automatic and semi-automatic



TYPICAL EXAMPLES OF SOME OF THE MACHINE TOOLS DEVELOPED DURING 1923

units where these can be developed and installed profitably. In some cases, power traverse has been applied to cutter carriages when in the past it was necessary for the operator to traverse the carriage by hand. Considerable improvement has been made in the simplification of machines to make them more nearly single-purpose tools. All parts that are superfluous have been eliminated without decreasing the effectiveness of the tool in its range of work. Lack of experienced help is influencing the building of semi-automatic machines or tools provided with "fool-proof" features. This provides insurance against damage through carelessness of unskilled operators.

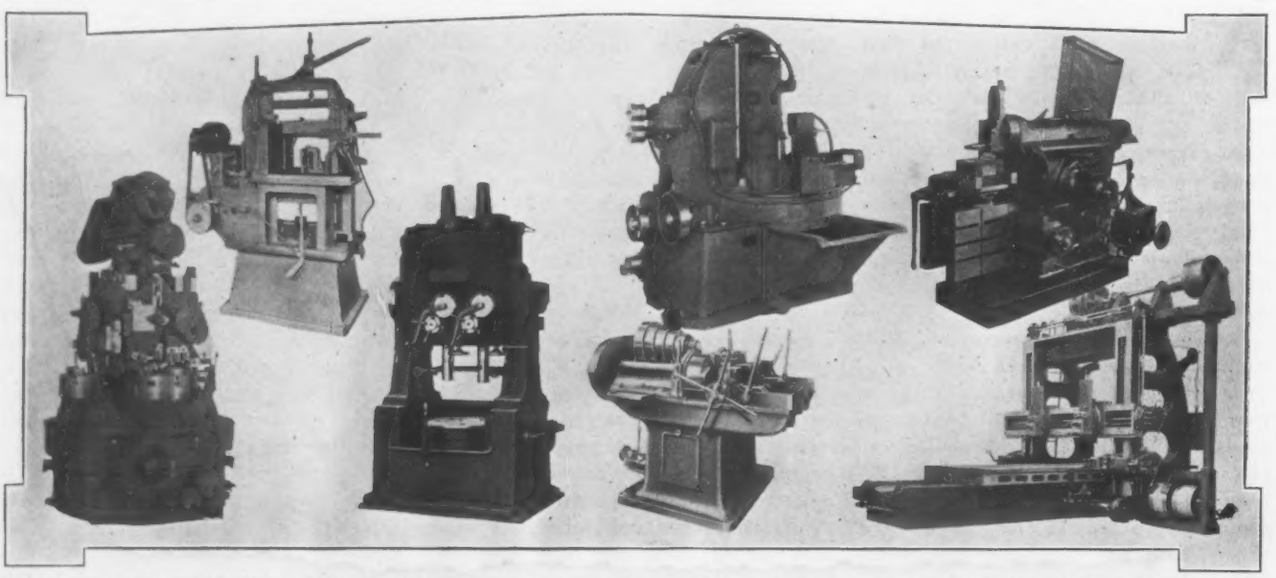
Without question the present tendency is toward heavier machines. In most instances where weight has been added, however, the machines have been built little larger. This has resulted from an attempt to maintain units in as compact form as possible and yet to provide the additional weight required for greater production. Railroads and manufacturers of heavy products are recognizing the necessity for tools of a more sturdy type and are specifying heavy-duty machines. Quality has been improved by the use of better grades of material.

Tools Have Excess Power

The design of machine tools bears direct relation to tool steels. Going back a few years it will be recalled that the introduction of high speed tool steel necessitated the construction of more powerful machines. Since then each advancement in physical properties of tool steels has placed another increment of power demand upon machine tools. In view of the continuous and rapid progress being made in the manufacture of tool steel, machine tool builders have designed their units with a large factor of safety. In other words, machines being built today are sufficiently strong to take care of tool steel advancement for some time to come.

Research work of machine tool builders, therefore, has resolved itself into the question of the best type of machine design to secure the maximum work from the existing tool steel. Increased production called for increased speeds and feeds. Excessive vibration resulted, therefore, it was necessary to build sturdier and heavier machines which would not vibrate under the conditions imposed. Each machine presents a problem of its own for it is necessary to bear in mind the limitations of finish and errors which are acceptable in the different classes of work.

Development of high speed steels and increased speeds have played an important part in present-day production. By way of example, one machine tool builder has prepared statistics on upright and radial drills. In the case of a 24-inch upright drill, it was found that the number of speeds had doubled in 20 years between 1883 and 1903 and again doubled in the next 20 years. Between 1883 and 1903 the speed of a ½-inch drill increased 36 per cent and by 1923 had increased to 135 per cent over 1903 or 220 per cent over 1883. Over a period of 30 years,



MANY OF THE MACHINES INTRODUCED DURING THE PAST YEAR WERE OF THE SEMIAUTOMATIC OR FULL AUTOMATIC TYPE

beginning with 1893, the 4-foot radial drill doubled its speed in 10 years, tripled the speed in 20 years and quadrupled the speed in 30 years. The speed of a ¾-inch drill increased 50 per cent in the first 10 years, 90 per cent during the next 10 years and 32 per cent during the next 10 years. Over the entire 30 years, speed has increased 275 per cent.

Many improvements in machine drives have been made during 1923. Individual electric motor drive continues in popular favor and an increasing proportion of machines are being so equipped. There is also a strong tendency toward single pulley drives and the elimination of cone drives. To increase production by means of the multiple spindle application, there has been an extensive adaptation of turret-type of work heads, particularly on gear cutting machines. Loading and cutting stations are so arranged that the machine becomes continuous in the production.

Operation Is Made Easier

One principal feature of 1923 construction is the convenience provided in the operation of machinery. Even on some of the largest tools built, it is not necessary for the operator to move from his steps to control every operation of the machine. Controls have been centralized and in most cases are interlocked to prevent the movement of levers which would cause damage to the machine. By making these machines so convenient for the operator to handle, considerable time is saved in loading and unloading. Perfection of work holding fixtures has facilitated loading and discharging of work and at the same time has eliminated springing under heavy cuts.

No review would be complete without making mention of the effect of radio upon the machine tool industry. The popular demand for radio equipment, which started in 1922, has become stronger in 1923 with the result that plants manufacturing this apparatus have been running at top speed and in many cases have increased production facilities. This business has created an unexpected demand for the lighter and higher speed types of machine tools and has produced a stimulating effect in several lines of tool manufacture.

The activity of the American Society of Mechanical Engineers in promoting research on machine shop practice may become an important factor in the near future.

Applications of Pressed Steel Increase

By W. W. GALBREATH

ENDOWED with almost unlimited possibilities of expansion, yet handicapped by inexperience, an absence of technical data, and a lack of appreciation by engineers and manufacturers of the advantages of its methods, the youthful pressed metal industry at the beginning of 1924 stands at the threshold of an era of important development. While the extent of future progress and the direction in which the most rapid advances will be made cannot be predicted, the broad tendencies are quite clearly reflected by the achievements of 1923.

Before reviewing the developments of the past year, it is advisable to consider a number of factors that influenced the pressed metal industry during and since the World war. Until about 1917, pressed steel manufacturers confined their activities almost exclusively to the automobile industry. Soon after the United States entered the conflict, however, the demand for ordnance castings made it necessary to conserve the foundry capacity of the country and the pressed metal manufacturers rose to the emergency by designing and producing stampings to take the place of certain castings. Tractor shoes, chain links, pintle housings and scores of other articles were made in pressed steel, thereby releasing considerable molding capacity.

Practically all of these products proved highly satisfactory, yet when the war ended, the jobbing press shops turned again to the automobile industry, which previous to the war had furnished the bulk of their business. In fact it safely may be said that pressed steel "made" the modern, light-weight, powerful, low-cost automobile, and with equal truth it can be stated that the modern automobile "made" the pressed steel industry. As a result of this close relationship, in the years following the war the pressed metal jobbers were so intent on keeping up with the demands of the automobile builders that they did not have time to develop sales effort in other lines.

This condition continued through the busy months of 1920, but in 1921, as competition became more keenly felt, a few of the more enterprising pressed metal jobbers began to ask themselves, "Why not try to introduce stampings to other industries, just as we have applied them so successfully in the automobile field?" Soon efforts were being made in a quiet way to show manufacturers the advantages of pressed metal, but in most cases they flatly rejected the idea; conservatism prevented them from changing from materials and methods they had employed for years.

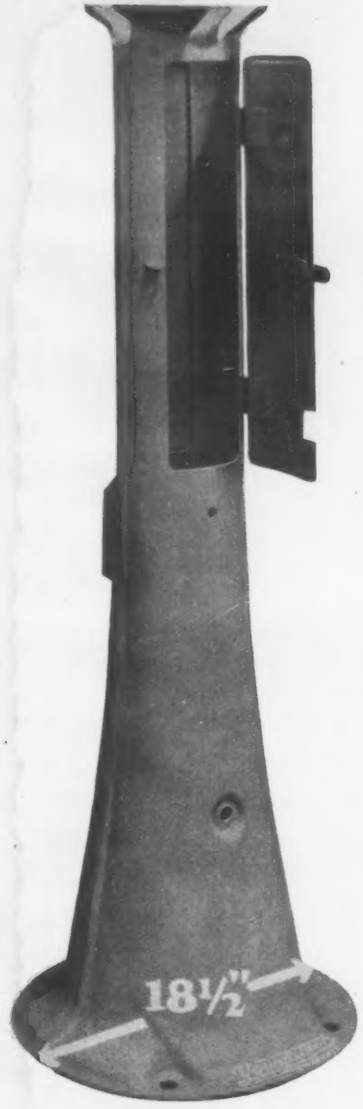
This rebuff clearly indicated that an educational campaign would have to be waged if engineers and executives were to consider the possibilities of pressed metal. Therefore the efforts of a few jobbers were turned to the task of disseminating information on the use of stampings in fields outside the automobile industry. This campaign has been continued through 1923, and is considered one of the most important activities of the industry. Perhaps the most effective factor in this educational movement is the Pressed Metal Trade Extension council, Chicago, which has been formed by a small group of manufacturers to show industry at large what can be accomplished by specifying pressed metal where it can be used advantageously.

Concurrently with the renewed activity along educational lines has been an effort on the part of a few to develop sales campaigns in fields in which the possibilities of pressed metal are little known. The success achieved in this direction is due very largely to "redevelopment," a term applied to the redesign and production in pressed metal of parts previously made by other methods.

As understood at the present time, redevelopment work is of two classes. In one, the pressed metal engineer simply tries to produce a stamping to duplicate a cast or forged part. In the second class the engineer designs the entire assembly of a product in order to utilize the maximum possibilities of pressed metal. Redevelopment in the first case is simply duplication, while in the second it is a matter of redesigning one or several parts to permit the use of pressed metal, or pressed metal in combination with castings or forgings.

Encouraging progress is being made in redevelopment work of this last mentioned type. For instance, gasoline pump bases and domes, truck radiator shells, industrial car wheels, clothes wringer frames, oil tank trucks, jack frames and many similar products are being fabricated from pressed metal. The manufacture of these articles on a production basis involves not only the usual stamping operations, but also welding, riveting,

The author is president, Youngstown Pressed Steel Co., Warren, O.

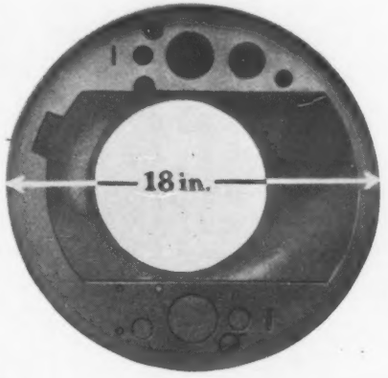


GASOLINE PUMP BASE

CLOTHES WRINGER FRAME

UNTIL recently pressed steel jobbing shops have been engaged almost exclusively on the production of single-piece products, such as hub caps, brake drums, etc. Now there is a tendency to assemble two or more pressed parts, forming articles similar to those illustrated on this page. The gasoline pump base, for instance, consists of two large pressed steel shells welded together to form a pedestal, to which hinges, catches, lugs and other fixtures are welded.

INDUSTRIAL CAR WHEEL



PUMP DOME

MOTOR RAIL

cleaning, brazing, grinding and other supplementary steps. In view of this tendency toward complete assembly, the modern pressed metal jobber who wants to extend his business into the general field of industry must possess an organization and equipment for fabricating assembling and finishing, as well as for stamping.

The principal savings resulting from the use of pressed metal may be summarized as follows:

1. Reduction in amount of material required.
2. Elimination of machining operations.
3. Actual speeding up of production in final assembly.
4. Saving in investment on plant and equipment.

As a rule, the extent of these savings depends upon the degree of co-operation between the customer and the pressed metal jobber. The maximum saving is obtained when the problem is submitted in its entirety to the best pressed steel engineer available, whose advice is bound to be invaluable.

The necessity for absolute dependence on the engineering staff of the pressed metal manufacturer is more easily understood when it is explained that there is an alarming scarcity of technical data on stamping. Because of the absence of rules and formulas, each jobber has to rely solely on the judgment and experience of his engineers and as a result each job involving a new problem of design requires an undue amount of expensive experimental work before actual production begins.

There also is a paucity of knowledge regarding the properties of materials best suited for pressed metal operations. The proprietors of jobbing shops would give a great deal to know what kind of steel to buy to best serve their purposes. Many of them frankly admit they do not know how to specify. Their problem also is complicated by the fact that one lot of sheets or strip may draw most satisfactorily, while the next, from the same company and rolled according to the same specifications, entails losses in the drawing operations of from 10 to 20 per cent. The pressed metal industry can well afford to pay a premium for sheets or strip steel of better quality in which these costly uncertainties are eliminated.

Perhaps the most encouraging indication of the past year has been the tendency of manufacturers to seek economies in production. This has caused many to investigate the possibilities of pressed metal. This point is well illustrated by the policy of a progressive manufacturer of a machine for household use, who recently ordered a large lot of pressed steel parts for his product. Although these parts have been delivered and thousands of the machines assembled, this manufacturer still is operating his plant at capacity turning out machines of the old design. Also, in spite of the fact that the use of pressed steel reduced the cost of the assembled machine considerably, the manufacturer thus far has refrained from marketing any of the new machines. As a result he has thousands of them in his warehouses.

When asked why he doesn't sell the new machines, he replies that he is holding them in reserve intentionally. "Some day," he said, "one of my competitors is going to try to find a way of producing his machine more economically? When he succeeds in doing so, I shall be ready to meet his competition."

Welding Is Employed on Broader Basis

BY JAMES W. OWENS

A DECIDED tendency on the part of executives of industrial plants to investigate the possibility of a wider application of welding and cutting is one of the outstanding developments of 1923. This change of attitude is the result not only of the "missionary" work and educational campaigns conducted by interested companies but also of the influence of the American Welding society and other agencies which have disseminated information on welding and cutting.

No revolutionary methods have been developed during the year, nor has any radical change in the design of equipment been noted. However, resistance welding machines have been improved and their capacities increased so that larger stock can be handled. Regulator devices for the control and delivery of gases have been improved and simplified in construction, thus making them more reliable and efficient in their operation. Torches and regulators have been developed with which both cutting and welding can be done interchangeably.

The chief advance noted in resistance welding is the greater use of drop forgings or steel stampings found in halves, which are resistance-welded together by the butt welding method. This method of manufacture secures uniformity of product, light weight and low cost. A well known aviation motor is made in this manner.

The Metropolitan Engineering Co., Brooklyn, N. Y., is manufacturing rear axle housings for automobiles of ⅛-inch steel in two halves with two simultaneous resistance butt welds 24 inches long. These probably are the largest butt resistance welds yet made.

Manufacturers of butt welding machines are tending to increase the secondary voltages of the transformers of these machines so as to facilitate the use of the "flash" method instead of the "pressure" method which has been in general use. Small armature shafts recently have been welded by the butt method without removing the coils or damaging the winding.

In spot welding the use of semi and entirely automatic machines has increased. A spot welding machine recently developed by the General Electric Co. and referred to by it as "the iron worker's needle and thread," is used extensively by the company in fabricating control boxes and shields for induction motors. This company is spot welding two ½-inch plates together without any difficulty. In the manufacture of steel automobile bodies, the Edward G. Budd Mfg. Co., Philadelphia, makes approximately 18,000,000 spot welds per day.

A more extensive use of seam welding has been observed. The General Electric Co. has developed a seam welder which is intermittent instead of continuous in its action. Paint drums now are being manufactured by seam welding instead of using a mechanically lapped seam.

In percussive welding, stock of ¾-inch cross section has been satisfactorily welded during the past year and there appears to be no limitation to a further development of machines for welding heavier sections except the first cost of the transformer. The Westinghouse Electric & Mfg. Co., manufacturers of this machine, also have perfected a universal machine of this type for welding stock up to ⅛-inch in diameter. This company also has solved the welding of cast iron by this method.

A greater demand for the gases used in welding and cutting has developed. Large industrials and the railroads have become interested in the installation of their own gas plants. A considerable demand for small portable acetylene gas generators also

The author is in charge of welding research for the bureau of construction and repair, United States navy, Norfolk, Va.

has been noted. These generators are of approximately 30 pounds capacity and their use eliminates the cylinders.

A notable extension in the gas welding of pipe lines has taken place. Oil, steam and refrigerating lines; gas and water mains; storage tanks for light oil; pressure vessels; automobile bodies; steel forms for concrete work; copper in the steel mills, where copper blast furnace parts are being reclaimed; aluminum and duraluminum in the airplane industry; and lead have been gas welded. On the newer types of airplanes gas welding has entirely supplanted brazing.

Examples of unusual gas welded structures, are a kiln, 8 feet in diameter by 125 feet long, recently made for the Union Carbide Co.; a 50,000 cubic foot gas holder erected in Columbus; and a 1200-foot steam line for 165-pound pressure at the Homestead plant of the United States Steel Corp. The largest operation in gas cutting has been the salvaging of the ships sold by the United States shipping board from the surplus war fleet and the cutting up of battleships and obsolete battle cruisers in accordance with the Hughes disarmament program. Cutting steel plate for use in fabricating machine parts, cutting off risers, and the use of the cutting torch as a machine tool are greater.

Arc welding has made steady progress during the past year, resulting in a large increase in the sale of equipment, particularly automatic machines. This method of welding although not as yet fully developed for welding nonferrous metals, nevertheless has made some progress. Both the carbon and metal arcs are used for welding these metals. The largest field of application for arc welding and the one in which decided progress was made is in the welding of iron and low and medium-carbon steel plates by the metal arc.

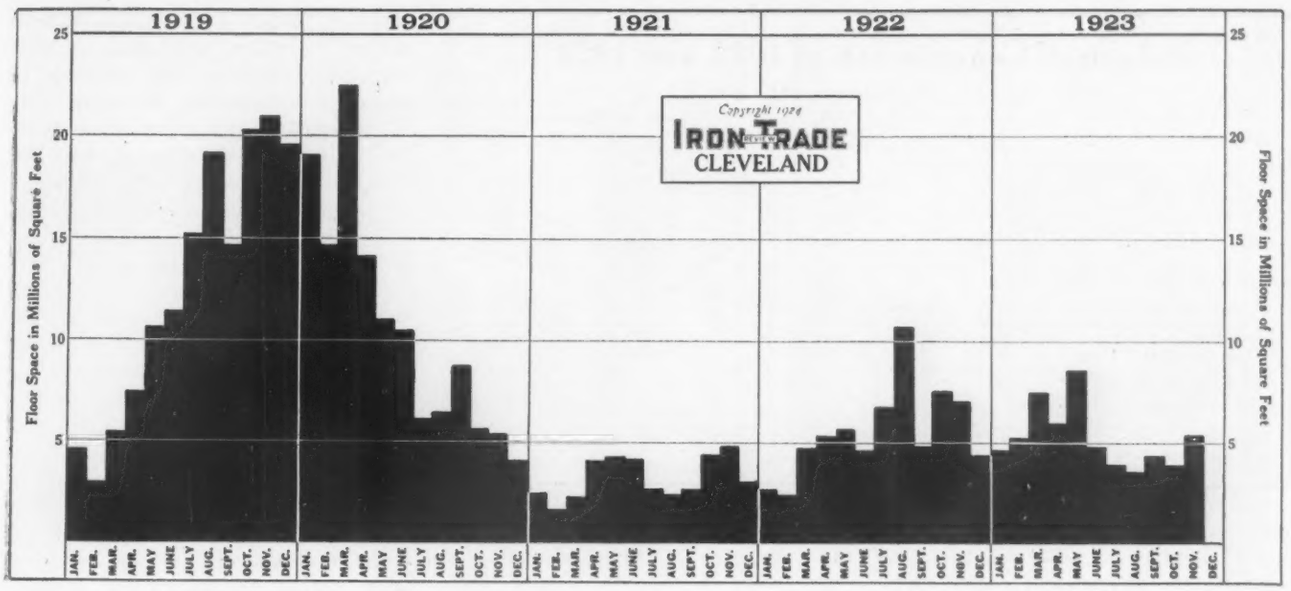
The use of manganese, nickel and high-carbon steel electrodes has increased on the railroads and in the mills. Welding oil, steam and refrigeration pipe lines, gas and water mains, automobile bodies, pressure vessels, etc., and salvaging expensive equipment steadily have progressed. Four fuel oil tanks, the largest weighing 35 tons and the smallest 19 tons were constructed by welding for the Equitable building in New York. On completion of the job, the tanks were tested by hydrostatic pressure to 25 pounds per square inch and proved absolutely tight. They were passed on the first inspection by the New York city fire department inspectors.

A WELDED BATTLE TOWING TARGET CONSTRUCTED AT THE NORFOLK NAVY YARD IN COMPETITION WITH RIVETED TARGETS. THE CONTRAST IN PREPARATION REQUIRED FOR WELDED AND RIVETED JOINTS IS SHOWN IN THE INSETS

Due to its low cost cutting with the carbon arc has increased in cases where a rough cut is satisfactory, for instance, in the case of cutting out rivets, cutting up railroad box cars into scrap sizes, cutting off of risers and cast iron cutting in general.

The Metal and Thermit Corp. has spent considerable money in research with a resulting improvement in the quality of its materials used in welding, improvement in technic and the efficiency of its welds. The application of thermit in mill work, and in the welding of rails, engine frames, etc., has increased in 1923.

In 1923, as in preceding years, the American Welding society was an important factor in developing welding and cutting. The society prepared an extensive report of its investigation on welded pressure vessels; inaugurated a program to obtain data and promote the application of welding in constructing bridges, buildings and ships; compiled, through E. H. Ewertz, a bibliography on ship welding; prepared specifications of welded fuel oil tanks; cooperated with other societies in investigating commercial rail joints; and with the federal board for vocational education, published training courses for welding based on the "job analysis" method.



Trend of Industrial Construction for Five Years. Chart Compiled from Figures Furnished by F. W. Dodge Corp.

Industrial Building Increases

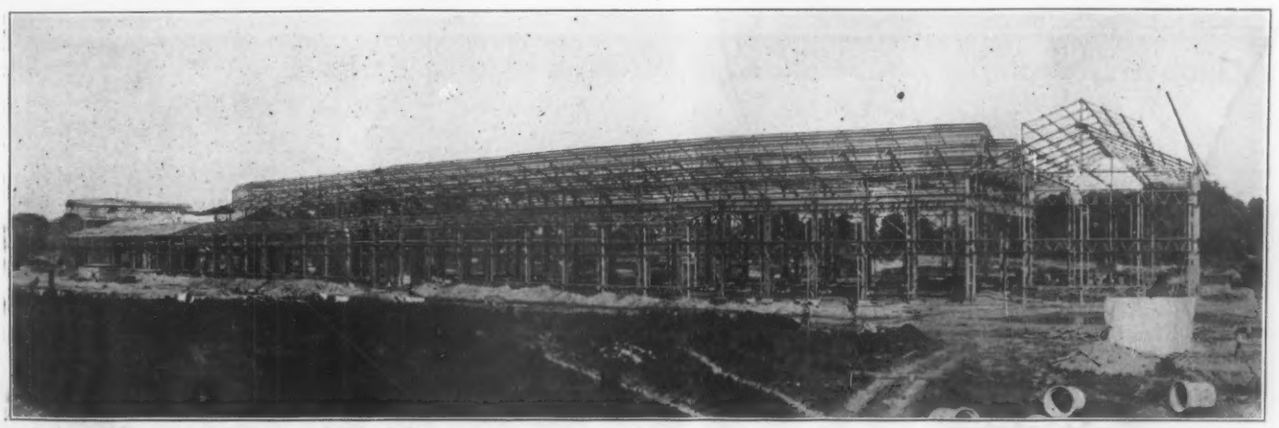
Progress of Country Reflected by Heavier Construction Program in 1923—Bulk of Work Composed of Expansion by Established Companies—Larger Amount of Building Being Planned for Present Year

BY ROBERT T. MASON

REFLECTING the resumption of normal progress and development, industrial construction of the country in 1923 gained approximately 16 per cent over 1922. Total incorporations of new enterprises in 1923 aggregated a higher monetary value than either 1922 or 1921, with a correspondingly increased demand for suitable accommodations which stimulated new industrial construction. It was not construction for newly incorporated companies that placed the year's activities on a higher basis than that of the preceding year, however, since the bulk of the building in 1923 was done for established companies. This was mainly in expanding existing plants and constructing new works to meet more adequately and efficiently increased demand and sharper competition.

Actual awards of contracts for industrial buildings placed in the period from Jan. 1 to Dec. 1, 1923, totaled 3736, as compared to 3563 in the like period of 1922, 2998 in 1921 and 5853 in 1920. These figures, compiled by the F. W. Dodge Corp., New York, represent building projects definitely launched.

In actual square feet of floor space built, 1923 falls below 1922, 57,613,900 square feet being the total for the first 11 months of the year just ended, as compared with 67,202,900 square feet in the same period of 1922. The Dodge company estimates a total for the entire year 1923 at approximately 80,000,000 square feet, which is considerably higher than the total for the whole year 1922, which amounted to 71,404,900. This is attributable to the falling off in new construction in December, 1922, and the unusual building activity noted during the month just closed. In dollar valuation 1923 projects totaled $355,690,200, while the



TYPICAL EXAMPLE OF INDUSTRIAL CONSTRUCTION IN 1923. ILLUSTRATION IS THAT OF TANK WORKS OF THE BALDWIN LOCOMOTIVE WORKS, EDDYSTONE, PA., ERECTED BY McCLINTIC-MARSHALL CO.

Industrial Construction in 1922 and 1923

Figures Include Awards from Jan. 1 to Dec. 1

Industry	Number of projects 1923	1922	Square feet of floor space 1923	1922	Cost of Construction 1923	1922
Metalworking	632	573	12,343,400	19,799,500	$51,090,300	$93,033,900
Miscellaneous unspecified	1,105	917	13,804,600	11,655,500	53,722,000	45,485,200
Food products	691	767	7,852,200	8,990,100	32,786,100	38,218,300
Textiles and cordage	197	207	3,213,200	4,008,500	13,063,700	17,713,000
Rubber working	41	33	579,600	388,000	1,888,800	1,142,600
Oil mills and refineries	50	48	845,300	461,900	8,222,800	4,548,000
Central heating and power plants	194	168	4,536,200	3,509,100	120,615,900	43,921,200
Chemical, paints, etc	139	184	1,212,200	1,986,600	4,518,700	8,512,800
Mining, quarrying, etc	197	172	3,148,800	2,921,000	16,154,200	19,081,100
Leather working	49	78	720,800	1,279,500	2,869,000	5,962,000
Glass working	28	..	1,915,600	.....	16,094,000	.....
Paper and pulp mills	85	84	2,196,700	1,264,000	10,727,500	6,224,400
Printing and binding	146	143	2,939,300	2,002,700	16,971,900	10,040,900
Woodworking	182	165	2,306,100	8,936,500	6,965,300	10,045,000
Totals	3,736	3,539	57,613,900	67,202,900	$355,690,200	$303,928,400

Figures furnished by F. W. Dodge Corp.

estimated construction expenditure for the 11 months of 1922 was $303,928,400 and the aggregate for the entire year, $323,225,900.

This indicates an increased cost per square foot of building, resulting from many factors, chief of which were the mounting costs of labor and the high prices of materials. The smaller total floor area was naturally a result of the increased cost, industrial executives putting a premium on efficient design and construction with view to eliminating useless expense. This is clearly demonstrated by the fact that 3736 contracts placed in the first 11 months of 1923 carried provisions for 57,613,900 square feet while 3563 projects in 1922 or 5.9 per cent less, had an aggregate of 67,202,900 square feer, or 16.6 per cent more than in the year just ended.

Starting 1923 at the lowest point reached in new construction for more than a year, industrial building soon picked up momentum. Contracts in January, February and March increased, with the last month registering approximately 7,700,000 square feet of floor space for the 27 northeastern states covered by the Dodge company. April construction dropped to approximately 6,000,000 square feet and then rebounded to about 8,800,000, the high point of the year. After May, work fell off into a midsummer slump, contracts awarded declining to approximately 4,800,000 square feet in June and 3,900,000 square feet in July. The low point was reached in August when contracts awarded totaled approximately 3,300,000 square feet. September awards increased to 4,100,000 square feet but a relapse occurred in October, contracts dropping to 3,900,000 feet. Activity began to increase with November, the total for that month being about 5,600,000 square feet, the largest monthly aggregate since the peak month, May.

Aided by better labor conditions than in 1922, the year 1923 registered an increase in construction by the mining and quarrying industries. In 1923 the construction awards made by the mining and quarrying companies totaled 197, having 3,148,800 square feet of floor space and representing an investment of $16,154,200, while 172 projects in 1922 had 2,921,000 square feet of floor space while aggregating a total expenditure of $19,081,100.

Power and central heating plant construction, including an unusually large amount of hydroelectric work in 1923 more than doubled the building of similar nature in the preceding year as computed in dollar valuation. With 194 projects in 1923 having 4,536,200 square feet of floor space, the capital represented amounted to $120,615,900. In 1922 there were 168 individual projects having 3,509,100 square feet of floor space and a dollar valuation of $43,921,200. The 1923 total is considerably higher than that of 1921 when 105 projects were launched having but 813,000 square feet of space.

In the metalworking field the first 11 months of 1923 registered a recession in construction. The total for that period involved 632 projects, having 12,343,400 square feet and an investment of about $51,090,300. For the same period in 1922, 573 separate projects called for 19,799,500 square feet of space and represented a capital outlay of $93,033,900. Again the comparison of data for the two years shows the keynote of industrial building in 1923 to be conservation of space and consequent cutting down of aggregate cost.

Variation in size of projects constructed is responsible for making June the high mark of the year in point of capital invested, although May was the peak as to millions of square feet of space built. In June, the total capital invested was $48,506,000, representing expenditure for 330 projects, having 4,817,000 square feet of floor space. In May 391 projects had 8,826,000 square feet of floor space and represented an outlay of about $47,557,000.

Following is a comparison of the number of industrial projects, square feet of space in thousands and dollar valuation in thousands by months in 1923, with a monthly average for the years from 1919-22:

Year and month	No. of projects	Sq. ft. in thousands	Dollars in thousands
1919 monthly average	636	12,772	$42,744
1920 monthly average	511	10,652	49,080
1921 monthly average	274	2,981	14,444
1922 monthly average	323	5,463	27,084
January, 1923	265	4,410	21,944
February	295	5,096	27,518
March	450	7,673	37,034
April	440	5,997	24,913
May	391	8,826	47,557
June	330	4,817	48,506
July	297*	3,861	21,197
August	301*	3,367	17,717
September	263*	4,100*	38,059*
October	351*	3,900*	32,721*
November	351*	5,600*	44,457*
December	....	....	....
Total for 11 months	3,736*	57,613*	$355,690*

*Figures furnished by the F. W. Dodge Corp.

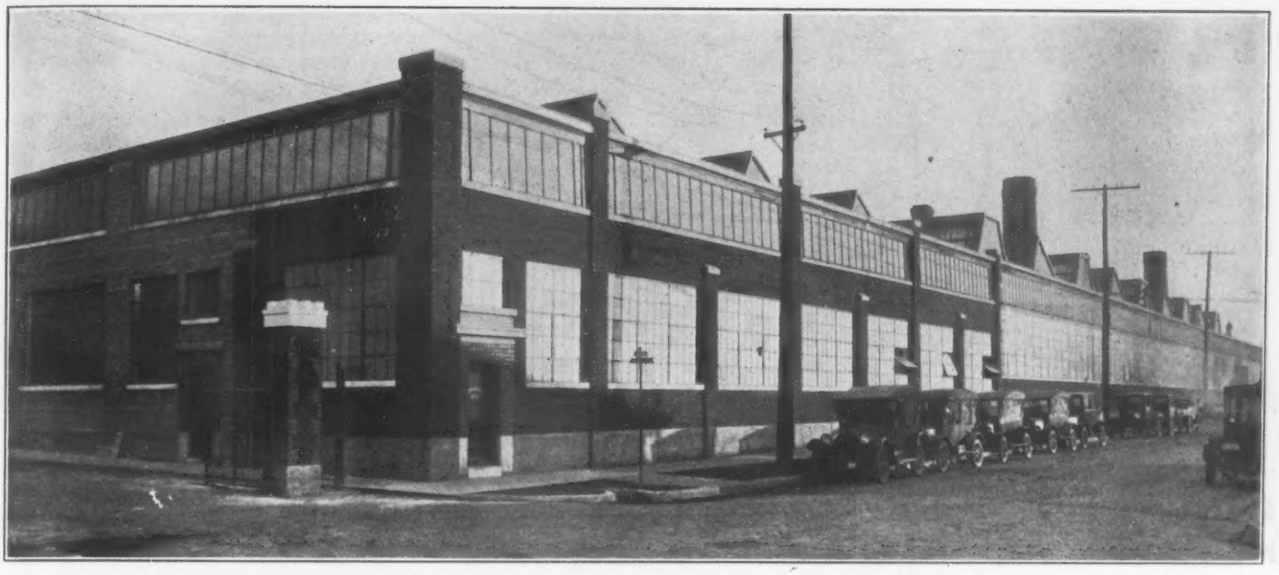
The keynote of industrial construction in 1923 dealing with expansions to established companies was that of economy of operation. In many cases buildings adequate as to size and form of structure were completely remodeled, expanded, or removed, to obtain more

Industrial Building Contemplated in 1922 and 1923

Figures Include Plans Projected from Jan. 1 to Dec. 1

Industry	Number of projects 1923	1922	Cost of Construction 1923	1922
Metalworking	911	691	$75,786,800	$101,584,300
Miscellaneous unspecified	1,532	1,292	114,678,200	63,706,900
Food products	1,054	1,077	50,264,300	62,302,400
Textiles and cordage	274	248	19,747,200	19,106,600
Rubber working	55	43	2,742,200	1,558,600
Oil mills and refineries	72	57	26,000,600	3,892,500
Central heating and power plants	382	285	264,378,700	183,457,400
Chemical, paints, etc	175	246	9,221,600	16,851,000
Mining, quarrying, etc	287	242	39,858,700	21,510,400
Leather working	69	92	4,946,000	8,806,000
Glass working	30	36	8,114,000	7,955,200
Paper and pulp mills	114	114	22,008,500	14,255,200
Printing and binding	203	202	14,365,900	17,053,800
Woodworking	278	228	11,584,300	11,355,700
Totals	5,436	4,853	$663,697,000	$533,396,000

Figures furnished by F. W. Dodge Corp.



NEW WORKS OF BELLE CITY MALLEABLE IRON CO., RACINE, WIS., A MODEL FOR ARCHITECTURAL DESIGN AND PLANT ARRANGEMENT. A. A. WICKLAND & CO., INC., CHICAGO, WAS ENGINEER

efficient operation, increased capacity or better marketing location with respect to shipping facilities.

Development of new types of industrial construction in the past year was largely fostered by economies to be effected through building of more efficient plants and the remodeling of obsolete structures. According to Harold K. Ferguson, of H. K. Ferguson Co., Cleveland, engineer and architect, "Much work was undertaken during the year in building plants for greater economical operation. Some of the obsolete types of buildings had to be completely remodeled and many had to give way to more practical plants. Competition in industry was so keen during the past year as to compel many companies to seek means of cutting down cost of production. In many cases this resulted in the construction of new buildings designed to increase efficiency and speed production. Expansion of plants by well-established companies all over the country and the building of branch plants was an important factor in the construction progress of 1923.

"Few new types of construction were brought out during the year, most effort being given to simplification with view to economy. One type which was introduced was that of a sawtooth building having 2100 square feet of space for every column, giving greater floor space and cutting the cost per square foot of construction."

Little work was undertaken for new enterprises as there was much floor space available to them because of bankruptcies and liquidations of other companies. Usually this space could be obtained at a lower cost than would have been available through specially constructed plants. Most of the construction work of the year was in additions to old plants and in new plants for established corporations. Some of the outstanding programs undertaken during the year in increasing operating companies were those of the Ford Motor Co., which built many branch plants and which is in

(*Continued on Page* 121)

NEW TYPE OF SAW TOOTH BUILDING WITH INCREASED FLOOR FOOTAGE PER COLUMN. PLANT IS THAT OF KENNEDY CARLINER & BAG CO., SHELBYVILLE, IND., FOR WHICH H. K. FERGUSON CO. WAS ENGINEER

The South San Francisco plant of the Pacific Coast Steel Co. is typical of the mills of the western states

Steel Industry Expands on Coast

Demand for Finished Products for Export During War and Inability of Eastern Mills To Supply Material Created Incentive To Produce Steel in Western States—Local Market Now Absorbs Output

BY DON PARTRIDGE
Pacific Coast Representative, Iron Trade Review

IS THE Pacific coast to become a real steel center? This is a question that has received the careful thought and attention of some of the country's most expert and far-sighted iron and steel men. During the past 10 or 15 years various interests have spent large sums of money in investigating the situation and its possibilities. In the last two or three years these investigations have been carried on more and more extensively with interesting developments.

Before proceeding further, it might be well to review briefly, the situation that has existed on the Pacific coast up until recently and in that way obtain a better idea as to why these various interests are so aggressively pursuing their activities. The first attempt to produce steel on the Pacific coast was the erection of one or two muck-bar mills. These met with indifferent success due to the fact that demand for this particular class of material was not sufficiently great to sustain operations.

Later on a few small open-hearth furnaces were constructed, but it was not until the outbreak of the European war that anything of importance developed. The heavy demand, at that time, for steel for export purposes, coupled with the fact that the eastern mills were unable to supply all of this demand, gave the mill operators on the coast their first real opportunity—an opportunity they were quick to grasp.

Five open-hearth furnace and bar mill plants were installed on the Pacific coast as follows: One in Seattle for the

THIS INTERIOR OF A LOS ANGELES WAREHOUSE SHOWING A LARGE ASSORTMENT OF SHEETS GIVES SOME IDEA OF CONSUMPTION ON THE COAST

Pacific Coast Steel Co.; two in Los Angeles, one at Torrance for the Llewellyn Iron Works recently purchased by the Columbia Steel Corp., and one for the Southern California Iron & Steel Co., and three in the San Francisco district, one each for the Judson Mfg. Co. at Emeryville, the Columbia Steel Corp. at Pittsburg, and the Pacific Coast Steel Co. at South San Francisco.

The output consisted chiefly of mild steel bars and reinforcing material although some channels up to 6 inches, were rolled. Thousands of tons were shipped to European and Oriental ports and some of it even found its way into the eastern markets of the United States. These mills met with marked success. Their earnings were used to enlarge the plants and to install better equipment with the result that at the end of the war the capacity of these five plants was approximately 420,000 tons annually.

In the early part of 1920, however, export demand practically ceased and in addition little domestic business was offered. This resulted in the Pacific coast mills facing an entirely new situation—the will and the way but no market. With the realization that the future of the mills depended upon their entrance into more diversified fields of steel production, steps were taken immediately to bring this about, if it were possible to do so.

Consumption Possibilities Studied

One of the first considerations was to determine the size and extent of the market, whether or not the consumption of the various classes of iron and steel products on the Pacific coast was sufficiently large to warrant the erection of additional mills and plants to produce such material as pig iron, sheets, plates, structural and wire products. This factor is of primary importance, for the success of any steel enterprise started on the coast depends entirely upon a market being found for the product in the territory which lies west of the Rocky mountains. In normal times the high freight rates that must be paid on steel products shipped from the Pacific coast to the eastern markets will not permit western producers to compete with eastern manufacturers.

While due consideration must be given to the export situation, the coast mills being favored somewhat by their advantage of location with respect to the Oriental markets, too much importance should not be placed on this business as an additional market for iron and steel products produced in the Far West. At best, this demand is uncertain. As a matter of fact, during the past three years there has been practically no demand, less than 5 per cent of the present production of the coast mills being shipped abroad. This uncertainty, together with the fact that competition for existing business is keen and that the prices obtained are always under those which can be secured for domestic business tends to make such a market an unattractive one.

The importance of the Pacific coast as a market for iron and steel products is becoming greater each year and the potential possibilities are almost unlimited. The ratio of the increase in the consumption of steel in this section undoubtedly is greater, by far, than that of any other district or territory in the United States.

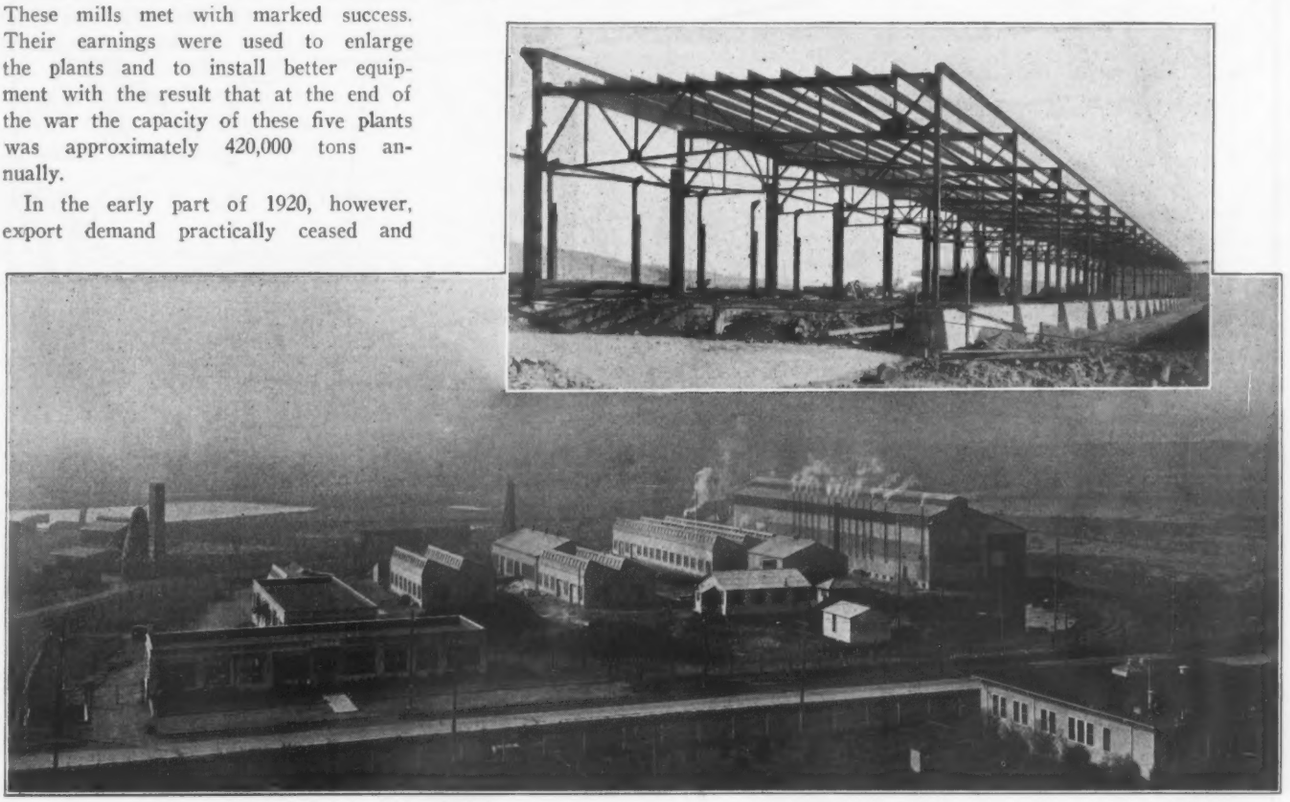
Western Consumption 6,000,000 Tons

A good idea of the extent and importance of Pacific coast consumption may be gained from the following figures. The totals shown are comprised of awards reported weekly in IRON TRADE REVIEW and include only orders in which 100 tons or more of material were involved. No attempt has been made to keep a record of the smaller tonnages which, however, would aggregate thousands upon thousands of tons. The figures are as follows:

Gross tons	1922	1923
Plates	63,288	174,372
Shapes	88,369	89,965
Concrete bars	17,523	51,547
Cast iron pipe	39,132	77,381
Tin plate (approx.)	.....	400,000

Total consumption of steel by Pacific coast territory and embracing west of the Rocky Mountains is probably not less than 6,000,000 tons annually. The principal products in demand are tin plate sheets, wire products, pipe, plates and shapes. Tin plate alone accounts for approximately 400,000 tons or 8,000,000 base boxes annually.

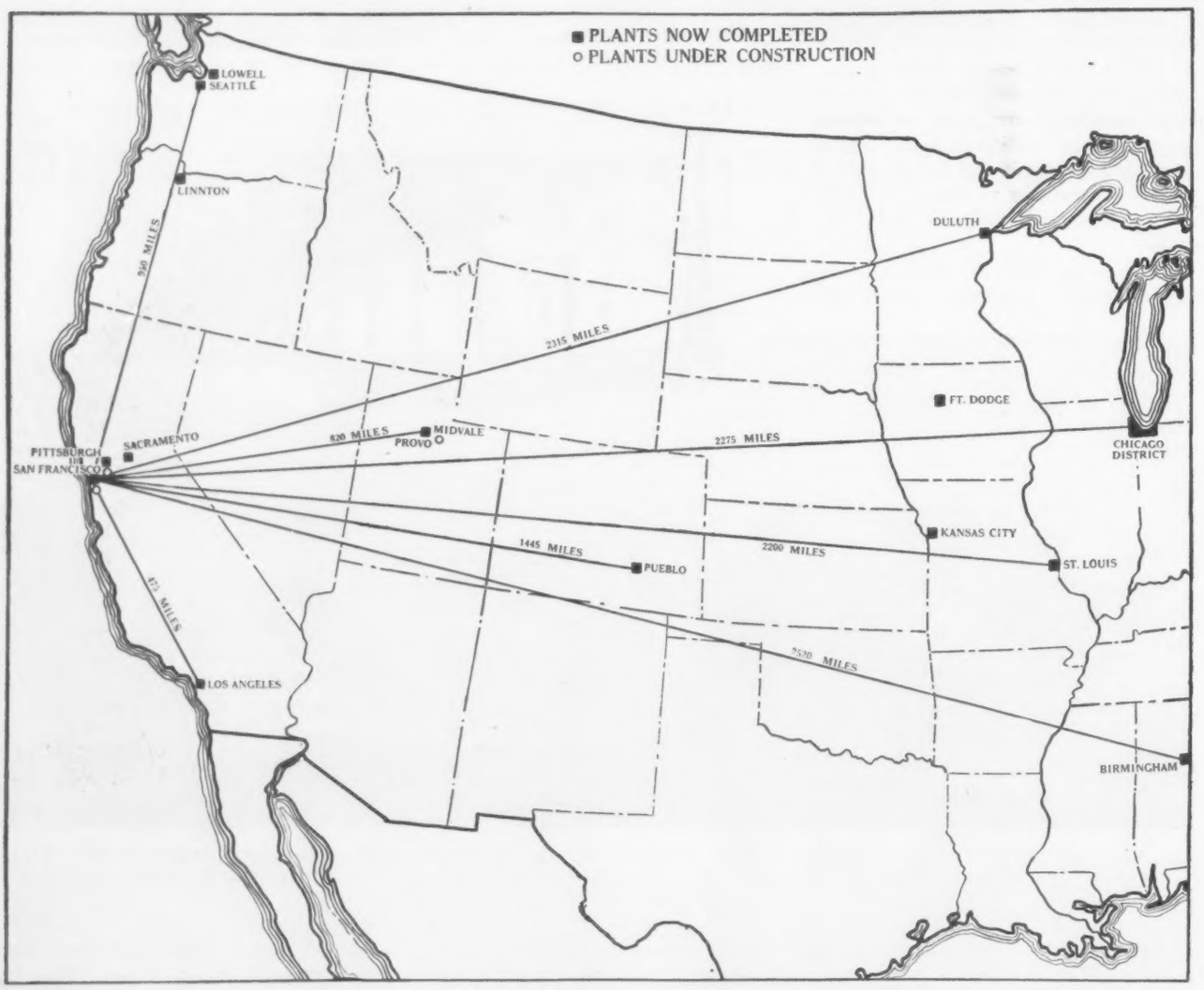
Further growth and expansion of the



(BELOW) THE DETINNING UNIT OF THE METAL & THERMIT CORP. AT SOUTH SAN FRANCISCO. NEW SHEET MILLS NOW ARE BEING BUILT ON THE PROPERTY AT THE RIGHT. (ABOVE) STRUCTURAL STEEL BEING ERECTED FOR THE SHEET MILL UNIT OF THE SAME COMPANY

steel business on the coast will come only as the population increases. What has been accomplished so far seems the more remarkable when it is considered that in this vast area the population is approximately only 6,000,000. At present rapid and unusual progress is being made in the building up of this section both from the residential and industrial standpoint. Expansion is not confined to one or two cities, such as San Francisco and Los Angeles, but is widespread and includes practically every city and town in the West. The continuance of this development will hasten the day when the Pacific coast will become a real steel center.

This lack of population has handicapped mill operators on the coast in their production of mild steel bars. The bulk of the present output consists of reinforcing material of relatively few sizes and for which there is a good demand. But offerings of merchant bars seldom exceed in size a carload lot and usually are composed of a miscellaneous assortment of sizes with the result that frequently rolls have to be changed two or three times a day. Thus, as far as the production of this class of steel is concerned, the bar mills in this section can hardly be classified other than as jobbing mills. Doubt is expressed in many quarters as to whether a similar condition would not be met with were a plate or structural mill to be erected. While it is true that in the aggregate a large tonnage is consumed annually, the individual requirements which comprise



MAP OF TERRITORY TRIBUTARY TO PACIFIC COAST SHOWING LOCATION OF EXISTING IRON AND STEEL PLANTS AND THOSE AT PRESENT UNDER CONSTRUCTION

Plants Completed

Pacific Coast Steel Co., South San Francisco, Cal., 6 Open-Hearth Furnaces, 3 Bar Mills.

Pacific Coast Steel Co., San Francisco, 1 Open-Hearth Furnace.

Pacific Coast Steel Co., Linnton, Oreg., 1 Open-Hearth Furnace.

Pacific Coast Steel Co., Youngstown, Wash., 4 Open-Hearth Furnaces, 3 Bar Mills.

Llewellyn Iron Works, Torrance, Cal., 2 Open-Hearth Furnaces, 1 Electric Furnace, 2 Bar Mills.

Southern Pacific Co., Sacramento, Cal., 1 Electric Furnace, 4 Bar Mills.

Judson Mfg. Co., Emeryville, Oakland, Cal., 3 Open-Hearth Furnaces, 4 Bar Mills.

Southern California Iron & Steel Co., Los Angeles, 2 Open-Hearth Furnaces, 1 Bar Mill.

Colorado Fuel & Iron Co., Pueblo, Colo., 5 Blast Furnaces, 2 Bessemer Converters, 15 Open-Hearth Furnaces, 1 Rail Mill, 1 Wire Mill, 4 Bar Mills.

Utah Steel Corp., Midvale, Utah, 2 Open-Hearth Furnaces, 2 Bar Mills.

Columbia Steel Corp., Pittsburg, Cal., 3 Open-Hearth Furnaces, 3 Bar Mills.

United Steel Co., Lowell, Wash., 1 Bar Mill.

Simmons Co., San Francisco, 1 Bar Mill.

Plants Under Construction

Metal & Thermit Corp., South San Francisco, Cal., 6 Sheet Mills.

Columbia Steel Corp., Pittsburg, Cal., 4 Sheet Mills.

Columbia Steel Corp., Provo, Utah, 1 Blast Furnace.

Columbia Steel Corp., Provo, Utah, 33 Koppers By-Product Coke Ovens.

the total include practically all sizes and gages.

The next factor which had to be considered, a factor which shares in importance with the one just discussed, was the source of raw material. In this respect successful operation hinged upon finding coal suitable for coke-making purposes. The problem of securing iron ore is of minor importance as large deposits of high grade of this mineral have been discovered in numerous sections up and down the Pacific coast.

While attempts have been made in the past to produce steel from iron ore by the direct process utilizing electric furnaces, the most notable of which was the Noble Electric Steel Co.'s plant in Shasta county, Cal., a commercial failure was met with in every instance due to the high cost of the electric energy. The present rate in California, set by the state commission, is $50 per horsepower per year. Until such time as these rates are materially lowered, little can be expected along this line of steel production. The maximum rate which would permit the successful operation of such a plant is variably estimated at from $10 to $20 per horsepower per year. From this it is seen that the production of steel on the coast by any other means than that of open-hearth furnaces depends upon the blast furnace method and this in turn hinges upon the coke.

Freight Costs Are Excessive

The present production of open-hearth steel in the West involves a procedure peculiar to this section. Over 95 per cent of the material charged into the open-hearths is melting steel scrap, little basic iron being used. This scrap is mostly of a miscellaneous character and it is not sorted and classified as extensively as is the case in the eastern markets. The average price being paid at present for this material is approximately $15 a ton delivered, compared with $22.75 for basic delivered in eastern Pennsylvania to which would have to be added from $6 to $9 a ton for freight, if shipped via the Panama canal, and approximately $20 a ton if shipped all rail.

Under the present practice, therefore, open-hearth steel production is limited to the melting steel scrap available, which is estimated roughly as being 300,000 tons per year. All of this is not produced on the coast, many thousands of tons being shipped in from Mexico and South American countries. During the war years when prices were high and scrap commanded premiums, thousands of tons were collected in outlying sections and districts. The reverse being true at present, much of this material cannot be utilized as in many instances the freight rate from the point of production to the works alone exceeds the delivered price per ton paid by the latter. Any increase in the present capacity of the mills on the Pacific coast will come about only by the utilization of more basic material in the open-hearth furnaces. This is fundamental as far as it concerns steel production.

Iron and Steel Units West of Colorado

Blast furnaces*	7
Open hearth furnaces	39
Bessemer converters	2
Electric furnaces	29
Finishing mills	30
Steel foundries	44
Gray iron foundries	348
Malleable foundries	8

*Includes one building and one electric.

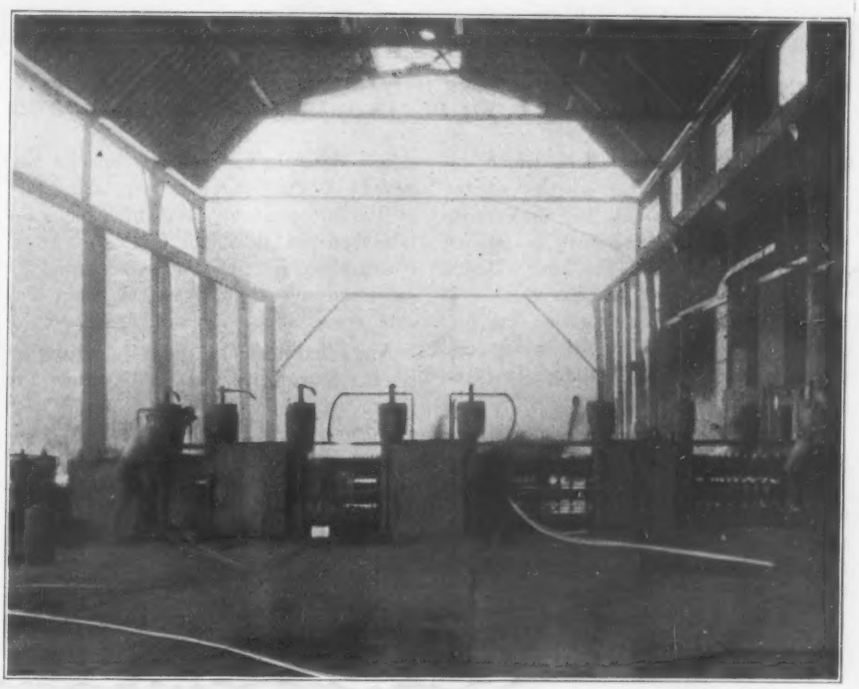
Although coal abounds abundantly in many sections on the Pacific coast, that which has been discovered in Oregon, Washington and California up until the present time has not had the characteristics essential to producing a coke satisfactory for blast furnace and foundry purposes. Further development of the great coal fields of Alaska may result in the discovery of a good grade of coking coal but experiments so far have failed to produce anything of importance. To the Columbia Steel Corp. must be given the credit for the first definite steps taken in the direction of blast furnace production. After many months, spent in surveying various coal properties, they found in Utah a coal field which would produce blast furnace and foundry coke of satisfactory metallurgical property. In addition, large quantities of high grade iron ore and limestone deposits were found nearby.

Plans for a blast furnace and coke oven plant at Provo, Utah, were immediately drawn up and within a short time contracts for construction were let. For the past six or seven months a large force of men has been at work on this project and it is expected that before the end of the first quarter of 1924 the plant will be in operation. The bulk of the iron produced at this plant will be shipped to Pittsburg, Cal., where this corporation for sometime has been operating open-hearth furnaces and bar mills. A departure from the usual procedure of producing open-hearth steel on the coast will be inaugurated. Instead of charging the furnaces almost entirely with melting steel scrap, the charges will closely correspond with the mixtures used in the east—only 40 to 50 per cent of melting steel will be used.

Building New Sheet Mill Plant

This company has just completed a wire rod mill at its Pittsburg plant and also has installed a number of nail machines. In addition, a six-stand sheet mill is being constructed and, in all probability, will be completed and in operation before the first of April, 1924. Another outstanding development in the production of steel products on the Pacific coast is found in South San Francisco, just a few miles south of Pittsburg, Cal., where a six-stand sheet mill is under course of construction for the Metal & Thermit Corp., New York.

Three years ago this company erected a detinning plant having a capacity of 30,000 tons per year. To utilize their by-product, melting steel scrap, to the fullest extent, it was decided to install open-hearth furnaces as well as a sheet mill. But inasmuch as the Pacific Coast Steel Co., whose plant is within one-half



A VIEW OF THE FIVE STANDS OF ROLLS OF THE 12-INCH BAR MILL RECENTLY COMPLETED BY THE UNITED STATES STEEL CO., EVERETT, WASH.

mile of the Metal & Thermit Corp.'s plant, had constructed six open-hearth furnaces and, were operating only three or four of them, arrangements were made with this company to take the detinning melting steel scrap produced by the Metal & Thermit Corp., melt it down and produce sheet bars. These sheet bars are to be delivered back to the Metal & Thermit plant and to be converted into sheets. This plant will be ready to operate sometime in the latter part of the first quarter of 1924.

Other projects are being planned but up to the present time nothing tangible has materialized. The Pacific Steel Corp., a newly formed corporation, which includes the plants and properties of the Pacific Coast Steel Co., has under consideration the erection of a 600-ton blast furnace either at Long Beach, Cal. or at South San Francisco. It is reported that this corporation has succeeded in locating in California, coal properties which will produce a good grade of blast furnace coke.

The iron and steel industry in the territory from Colorado west is more extensive than many appreciate. As shown in the accompanying table, there are six completed blast furnaces in this district; and one is now being built. One of the six is of the electric type. The number of open-hearth furnaces totals 39 but there are only two bessemer converters and both of these are in Colorado. Electric furnaces used exclusively in the iron and steel industry total 29. The rolling mill capacity now is undergoing expansion although at the present time 30 mills are devoted to finished products, chiefly bars and sheets. Throughout the western states are found 44 steel foundries, 348 gray iron, and eight malleable foundries.

In the meantime the eastern producers of steel products are giving this section more and more attention. Several of the larger companies have increased their holdings and the Steel corporation now is erecting a large warehouse in Los Angeles. A notable increase in the size of the Pacific coast sales organizations of nearly all eastern companies has taken place during the past one or two years. Within the last year a number of the independent companies have established branch offices in Los Angeles. Formerly this territory was covered by salesmen operating from the main Pacific coast offices in San Francisco.

Any discussion of the steel situation on the Pacific coast should include the factor of foreign competition. British and continental mills are seeking business aggressively in this territory and in the case of pig iron up to the present time, this competition has been the controlling factor. Only at rare intervals in the past have the eastern and southern mills been able to compete with these interests, due to the high rail and water freight rates on material shipped from the East coast. As a result, it is safe to say that at least 90 per cent of the pig iron consumed on the Pacific coast has come from foreign countries. Whether this condition will continue after the Columbia Steel Corp. blast furnace is blown in remains to be seen.

Other foreign steel products which have been sold rather extensively on the coast in the past include rails, merchant bars and light shapes. Competition on other forms of steel products is not considered serious by any means. Due to uncertainty in delivery, together with the fact that the quality and the dimensions do not correspond with the steel produced in this country, consumers and distributors do not favor such foreign material as plates, larger shapes, sheets and similar steel products.

Lately a good deal of French made cast iron pipe has been sold in the southern part of California. The introduction of such pipe on the coast is of such recent nature as to prevent any real opinion being given as regards the permanency of this competition. Time alone will tell. At the present time there are only two or three foreign made steel products which find a ready market on the coast. These are pig iron, rails and just lately, cast iron pipe.

Those who are in close touch with the situation and who are cognizant of the rapid strides that are being made in the development of this part of the country, not only from the standpoint of population but in industrial growth, are of the opinion that the day is not far off when the Pacific coast will become a real steel center.

LARGE STOCKS OF NAILS CARRIED BY ONE PACIFIC COAST JOBBER AS NECESSARY TO SUPPLY WESTERN DEMAND. A PORTION OF THE SHEET STOCK IS SHOWN IN THE FOREGROUND

A high record of 8,823,879 tons shipped in 1923 was established for the Hull-Rust iron mine. The 350-ton shovel is of special type developed by Oliver Iron Mining Co.

Progress in Iron Ore Trade Reflects Prosperity

BY A. J. HAIN

SHIPPERS of Lake Superior iron ore are preparing for another prosperous season, mine operations being scheduled with confidence that blast furnaces in 1924 will absorb approximately as much ore as in the past year.

In practically every branch of the industry, exploration, stripping, mining and construction, there is more activity today than at any time since the peak of wartime effort. Everything possible is being done to assure a large production in the future on an economical basis; means for eliminating or reducing manual labor and obtaining a good flow of standard material as expeditiously as possible are receiving more attention than ever before.

While open market quotations on ore generally are determined in the spring of the year when pig iron producers make their purchases, and the prices remain comparatively stable for the season, the real competition in the ore trade comes in cutting costs, in being able to meet fixed market conditions with the assurance of a satisfactory margin. That is reflected everywhere in mining operations. The industry is in a rapid process of transition, for in the lifetime of many of those identified with it the mining and merchandising of Lake Superior ore has had a meteoric rise from nonexistence to a remarkable state of size and perfection.

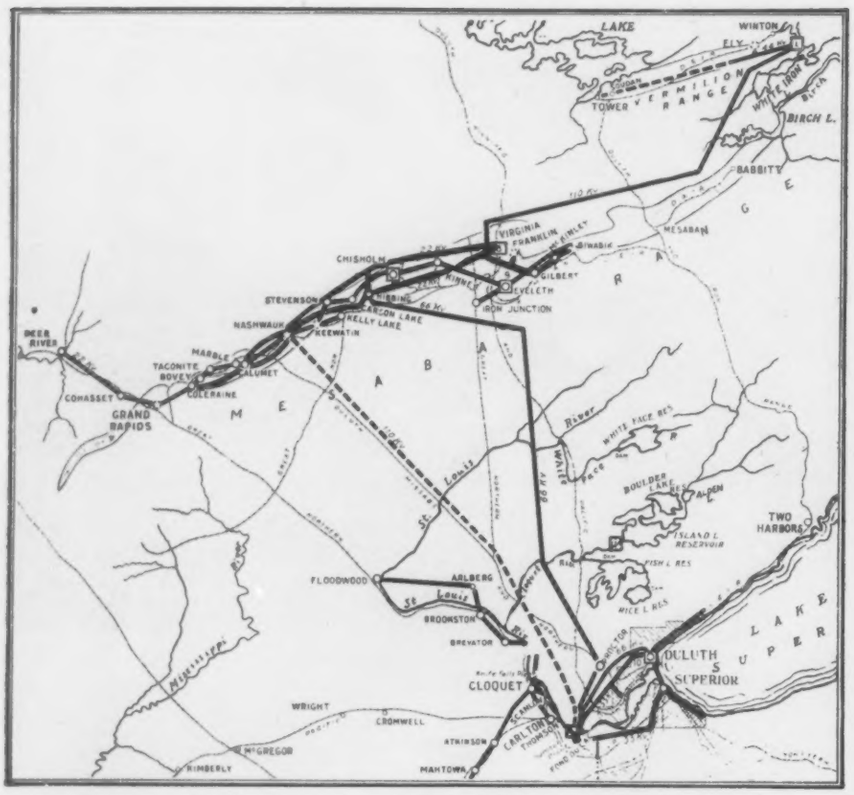
Approximate Shipments by Ranges

	1922	1923
*Mesabi	28,055,394	41,142,671
*Vermillion	1,211,467	1,164,963
*Cuyuna	1,497,615	2,094,925
Total Minnesota	30,764,476	44,402,559
*Gogebic	6,219,610	6,239,470
*Marquette	2,817,390	3,600,481
*Menominee	4,078,519	4,794,194
Mayville, etc.	110,101	107,500
Misc. shipments by rail	†	1,800,000
Grand total	43,990,096	60,944,204

*Includes lake shipments only in 1923.
†Absorbed in range figures for 1922.

The Minnesota state tax commission, as vigilant a body of tax agents as can be found anywhere, bringing to bear scientific knowledge on the subject, this year places the amount of merchantable iron ore in the ground in that state as 1,301,613,058 tons. An annual shipment of 60,000,000 tons, as in 1923, would exhaust that amount in 21 years. This would mean the removal of two billion tons of ore from Minnesota over a span of 60 years, that is, from 1884 when shipments began in a small way, to 1944.

The speed of development in this main producing area is apparent when



USE OF HYDROELECTRIC POWER SPREADING

This map shows how a network of transmission lines from hydroelectric and steam-electric stations has been extended recently throughout the Mesabi and Vermillion iron ore ranges. An amalgamation of various companies in 1923 brought about a "super-power" development, with a generating capacity of more than 100,000 horsepower. A 15,000-horsepower hydroelectric plant now is in course of construction, and the ultimate capacity will be 200,000 horsepower

it is recalled that it has been only 31 years since ore was first forwarded from the Mesabi range and less than 25 since it came out in volume. The economics of the industry today are in keeping with this rapid rate of progression.

As the mines are operated by, or in control of a comparatively few large interests, the pressure for economies is a striking feature of the business. This is due in large measure to the fact that the United States Steel Corp., is the great balance wheel of the industry. The absorption by the corporation of 45 per cent of all the ore that is produced, converting it into iron and steel and manufactured products and selling these in competitive markets, compels a low productive cost at the source, and necessarily holds down the price the independent manufacturers can be called on to pay. All the competition in the iron and steel markets, wherever American material or products are sold, bears down on the ore industry, an industry of which it often is said "there is no competition."

That is why, when the volume of shipments are at the highest, some of the operators in the less advantageous circumstances as to the character, place or cost of mining their ore, say the business is not profitable, or should be more profitable. Volume means little to them; they are not struggling to produce ore so much as they are endeavoring to get it into the market at less expenditure.

This is leading to highly specialized development, though some of these operators complain that the industry is overdeveloped. They are installing newer and better equipment; the use of electric power, particularly, hydroelectric, is making tremendous strides. Let a promising device or apparatus appear and it is given a tryout; engineering skill is concentrated in developing better methods, with nothing accepted as conclusive. A revolutionary change within a season is not expected.

It has been several years since the magnetic concentrating project at Babbitt got under way and focused the attention of all mining men as a serious, well-directed, well-financed, large-scale plan for utilizing an immense deposit of low grade material. This has had to be in competition with the best mines in the Lake Superior district, with rich ore produced at minimum cost. The enterprise has made steady progress, has grown to some extent, and most important of all has proved the estimates on which it was based.

The building of more ore washing and concentrating plants at various mines which have had remarkable production records in the past give further indication of the economic trend. Old mines are being "cleaned up"; vast deposits are being opened. No immediate prospect of an abnormal rise in ore prices due to a depletion of supplies confronts the consumers; recent developments have all been in favor of keeping prices down. The largest producers are operating at a good profit because of their foresight, though mining costs show considerable variance, and all have increased in recent years.

A representative operator's cost of taking a ton of ore out of an open pit is 150 per cent higher today than in

Minnesota Ore Reserves and Assessed Values

Ore in Ground

County	Tons (May 1, 1922)	Assessed value (May 1, 1922)	Tons (May 1, 1923)	Assessed value (May 1, 1923)
St. Louis	1,115,798,744	$250,068,788	1,120,078,655	$252,189,536
Itasca	141,252,860	17,460,099	138,945,184	18,871,226
Crow Wing	29,222,269	3,030,509	42,538,241	3,752,290
Lake	50,978	.....	50,978	.....
Totals	1,286,324,851	$270,559,395	1,301,613,058	$274,813,052

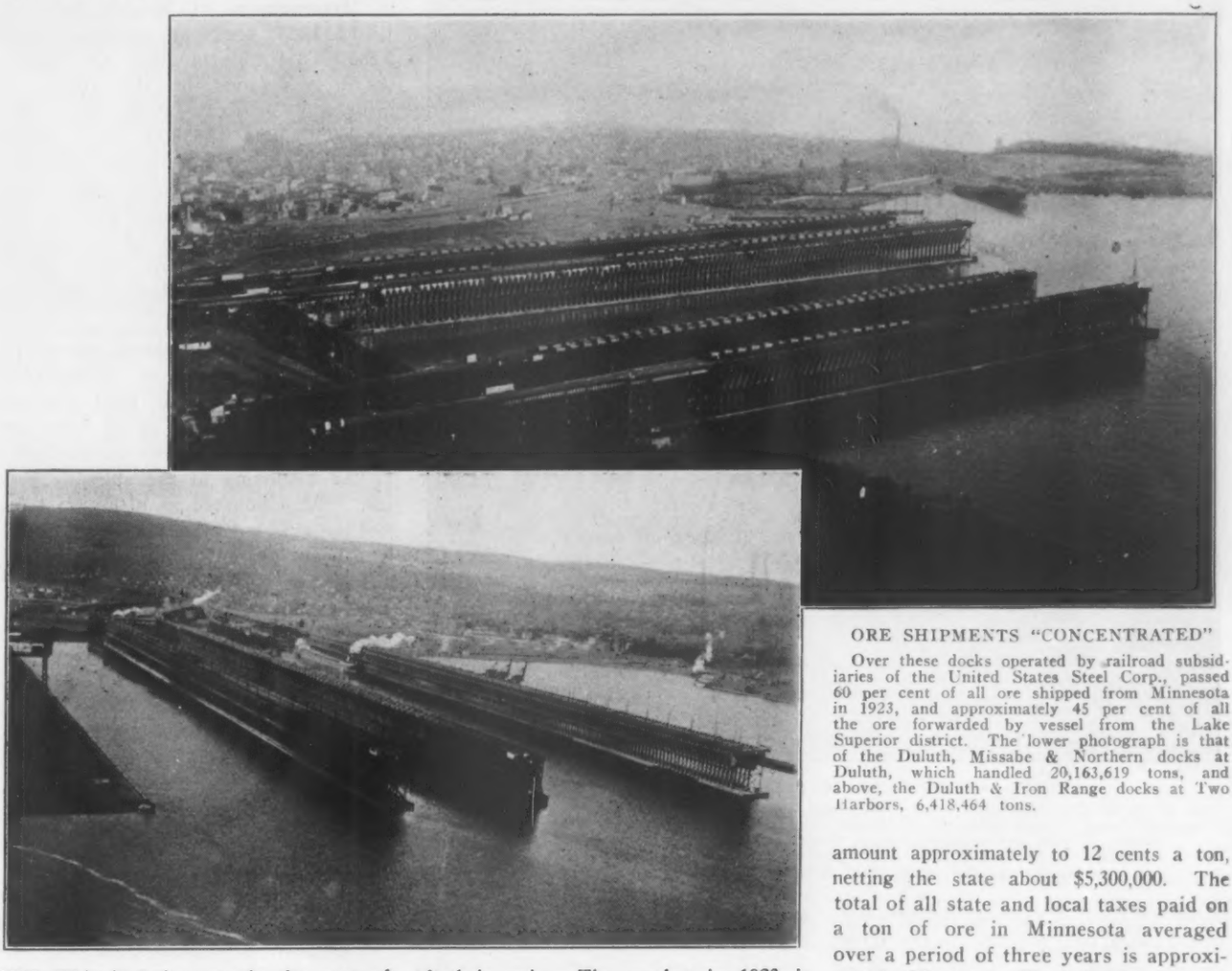
Ore in Stockpiles

St. Louis	9,687,949	$ 6,770,767	9,168,123	$ 8,945,814
Itasca	431,443	305,106	357,841	616,139
Crow Wing	262,890	181,570	502,859	617,425
Lake	3,574	3,199	.....	.....
Totals	10,385,856	$ 7,260,642	10,028,823	$ 10,179,378

Total Merchantable Ore in Ground and Stockpiles

St. Louis	1,125,486,693	$256,839,555	1,129,246,778	$261,135,350
Itasca	141,684,303	17,765,205	139,303,025	19,487,365
Crow Wing	29,485,159	3,212,079	43,041,100	4,369,715
Lake	54,552	3,199	50,978	.....
Totals	1,296,710,707	$277,820,038	1,311,641,881	$284,929,430

The assessments as given in this table do not include the assessments for surface values, structures or improvements.



ORE SHIPMENTS "CONCENTRATED"

Over these docks operated by railroad subsidiaries of the United States Steel Corp., passed 60 per cent of all ore shipped from Minnesota in 1923, and approximately 45 per cent of all the ore forwarded by vessel from the Lake Superior district. The lower photograph is that of the Duluth, Missabe & Northern docks at Duluth, which handled 20,163,619 tons, and above, the Duluth & Iron Range docks at Two Harbors, 6,418,464 tons.

1913. This includes merely the cost of the mechanical work involved. Underground, the cost of removing a ton of ore has increased 86 per cent. Stripping today costs 50 cents a cubic yard, compared with 22 cents in 1913. The average labor cost is $4.55 per day as against $2.73 in 1913. All other items involved in the shipping of ore, including freights, taxes, and royalties where based on selling prices, have advanced. The shippers in Minnesota in the past year paid the state $6,000,000 as a tonnage or occupational tax for 1922 and 1921, in addition to $36,600,000, real and personal property taxes for those years. The Oliver Iron Mining Co.'s occupational tax for the two years was $4,340,499. Payments were made when the United States Supreme Court determined the validity of the new law. During the two years for which a total tax of approximately $42,000,000 was paid the output of ore from Minnesota was 48,473,047 tons.

In the rush to sell ore in the spring of 1923, following the lean years of 1922 and 1921, some producers made contracts on a basis below the open market quotations. Less than 3,000,000 tons of ore was sold at such quotations. The quotations were advanced 50 cents over those of 1922, but this was not the measure of their gain. The market in 1923 is described by many of them as having been demoralized; though none will complain that he lost on the year's business.

Wages were advanced 15 per cent at the outset of the season, and then the Minnesota state tax commission refused to take note of contract prices in calculating the tonnage tax.

The state was successful in having the law declared constitutional. The commission interpreted the law as requiring it to use open market quotations in determining the amount of tax, as this tax is based on selling values at lower lake ports. The occupation tax for 1923 will amount approximately to 12 cents a ton, netting the state about $5,300,000. The total of all state and local taxes paid on a ton of ore in Minnesota averaged over a period of three years is approximately 70 cents. The advance in quotations also automatically raised royalties in numerous cases.

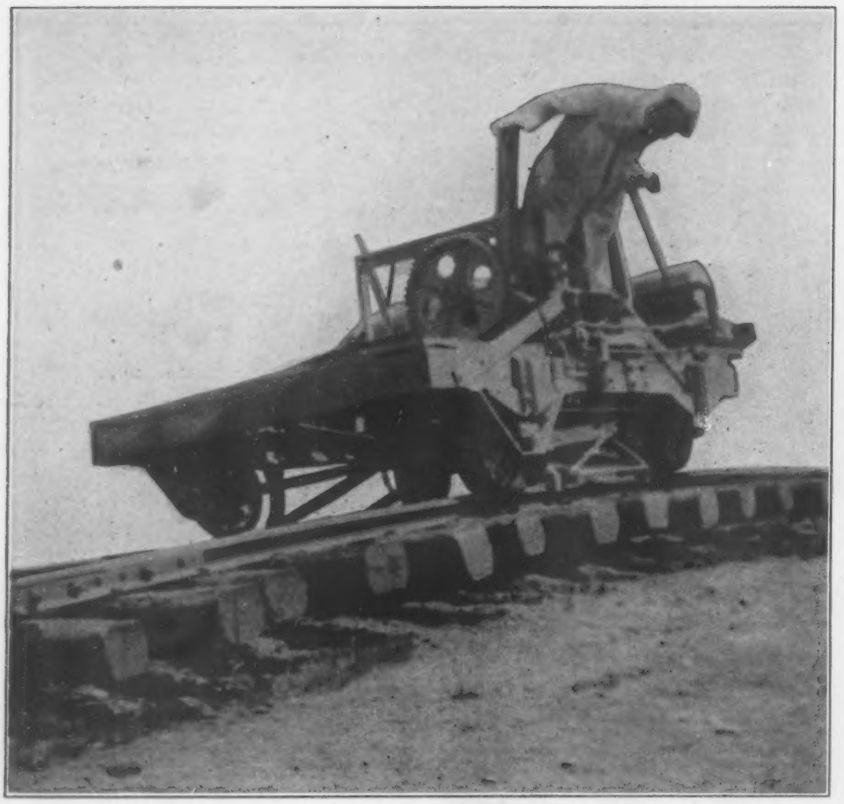
A year ago it was predicted that "some advance in the selling price of ore was a strong probability," a prediction that was borne out. Those who took long term contracts on a sliding scale basis, under 1923 open market quotations, will not be inclined to see the new prices reduced.

Lake Superior iron ore at furnaces and lower lake docks on Dec. 1 amounted to 42,450,000 tons. Consumption of ore in 1923 to Dec. 1 totaled 57,757,000 tons, the largest amount on record, averaging 5,250,000 tons a month. The total for the year is likely to be 62,000,000 tons. Blast furnace operations though shrinking steadily for the last six months have required in excess of 4,000,000 tons of Lake Superior ore monthly. If there is no decrease below such a figure in the next five months the tonnage on hand May 1 will be around 20,000,000 tons, about normal for the beginning of the "season" in ore shipping.

Various estimates have been made as to the probable new requirements of ore, based on the expected rate of furnace operations, and the majority of shippers place the 1924 tonnage at 55,000,000 to

Ore Shipments by Ports and Railroads

	—Gross tons— 1922	1923
C. & N. W., Escanaba	3,053,866	3,793,620
C. M.& St.P.,Escanaba	1,538,488	1,813,191
D. S. S.&A., Marquette	364.840	848,303
L. S. & I., Marquette	1,611,380	1,940,982
C. & N. W., Ashland..	4,659,315	4,910,704
Soo Line, Ashland...	1,153,892	1,326,745
Great Nor., Superior..	9,943,286	15,725,551
Soo Line, Superior...	920,276	1,375,138
Nor. Pac., Superior..	370,678	719,187
D. M. & N., Duluth...	13,044,771	20,163,619
D. &I. R.,Two Harbors	5,952,437	6,418,464
Total	46,613,229	59,036,704
1923 increase		16,423,475



TRACK SHIFTER "LIFTS SELF BY BOOTSTRAPS"

One of the novel devices brought out in the Lake Superior iron ore district recently is a gasoline operated track shifter, intended to replace more ponderous equipment under certain conditions. Tracks are constantly being shifted in mining operations. The shifter is clamped to the rails and the entire machine with rails is racked up on a spud, the tilt starting the whole raised mass sliding over to the intended side

60,000,000 tons. A year ago shippers estimated a total of 55,000,000, and the actual amount proved to be 60,944,204. When they prepared their estimate they were emerging from a dull period; shipments in 1922 were only 43,990,096 tons, and in 1921, 22,798,349. The outlook was much more obscure than it is today; there was less to support their confidence, but they had sufficient faith in the estimate to proceed with their operating programs on such a basis.

Today there appears to them to be much more certainty of realizing an estimate of 55,000,000 tons than there was a year ago. The estimate represents a composite of many calculations but is the result largely of "guesswork," though guesswork of men who have proved to be successful "guessers" when it comes to making up appropriation budgets. It reflects their opinion of what the year will bring forth, not only of interest in the ore trade, but to business in general.

Shipment of iron ore in 1923 from the Lake Superior district was the fourth largest on record, and from the Mesabi range the third largest. The total of 60,944,204 tons, by vessel and all-rail routes, was 16,954,108 tons more than that of 1922, and within 5,714,262 tons of the highest record, 66,658,466 in the year 1916.

This brings all shipments from the opening of the ranges to 1,134,690,138 tons. The lake shipments in 1923 were 59,036,704 tons; the remainder consists of all-rail shipments, which at this time are estimated.

The Mesabi range last year increased its shipments from 28,055,394 tons to 41,142,671. The output from the Vermillion range was not as large as the figure for 1922, 1,211,467. The Cuyuna range that suffered most in the slump after the wartime activity made a remarkable showing owing to intensive developments in recent years, and the better outlet for the ores.

The Cuyuna increased its shipment from 1,497,615 tons in 1922 to 2,094,925, or about 40 per cent, a little better than the average for the entire Lake Superior district. The Menominee increased from 4,078,519 tons to 4,794,194, while the output from the Marquette advanced from 2,817,390 to 3,600,481 tons. The figure for the Gogebic range is about the same as in 1922; on that range important developments are being made in constructional work.

Ore Reserves Reinstated for Tax

The Cuyuna range received recognition in 1923 in other respects than by the use of its ore. The state tax commission reports the total tonnage of merchantable iron ore in the ground in Minnesota as of May 1, 1923, at 1,301,613,058 tons, an increase from 1,286,324,851 tons in 1922. On examination it is found that the increase is principally in Crow Wing, from 29,222,269 tons to 42,538,241 tons, apparently a "find" of 13,315,973 tons. It does not represent "new" ore, however, but a reinstatement on the tax lists of certain grades of ore of the Cuyana range that were taken off in the "hard times" following the war period.

All the ore in Minnesota was given an assessed value of $274,813,052 which divided by the total tonnage results in an average of 21 cents on ore in the ground. Ore in stockpiles at the beginning of the shipping season, 1923, amounted to 10,028,823 tons, and the assessed value was $101,179,378. The heavy tax on ore mined during the winter and found on stockpiles in the spring, the same as personal property, is causing a reduction of such stockpiles.

Last year at this time the stockpiles in the whole Lake Superior district amounted to about 6,000,000 tons. Now they are 3,000,000 tons the lowest for this period since 1920. The personal tax on stockpiles has a tendency to slow up winter mining in Minnesota, when large labor forces must be kept intact. Winter mining must be done under ground.

Extensive exploration work was carried on in 1923 in the efforts of iron ore producers to locate new and desirable deposits. Stripping was unusually heavy in preparation for the opening of new mines and the extension of others. About 10,000,000 cubic yards of overburden was removed from ore deposits in 1923; representing in some instances the beginning of new work, and in others a continuation of that begun in previous years.

Some of the large mines where stripping projects of great magnitude are under way are the Scranton, Danube, Mahoning and Majorca, operated by Pickands, Mather & Co.; the Hull-Rust, Morris, Burt-Sellers, Prindle, Fraser, Arcturus, Missabe Mountain, Minnewas, Adams-Spruce and Hill-Annex of the Oliver Iron Mining Co.; the Susquehanna of the Rogers, Brown Iron Co., Shada, of Clement K. Quinn & Co., and the Wabigon of the M. A. Hanna Co. All of the foregoing mines are on the Mesabi range and represent the largest projects, though stripping is general throughout Minnesota. The Oliver company started to strip the former site of Hibbing, but was interrupted by a court proceeding. This is of a temporary character, however, as the main issue

involving the removal of the town and the mining of the ore has been settled.

The Oliver company has approximately 11,000 men at work in the Lake Superior district this winter, and Pickands, Mather & Co., have about 3500, as compared with 4000 during the shipping season. The latter company easily ranks second, after the Steel corporation's subsidiary, in the importance of its mine operations, since it is operating mines which figured in the recent purchases by the Bethlehem Steel Corp.

This company has operating control of the Mahoning Ore & Steel Co., owner of a lease to 1000 acres on the Mesabi range, which includes the Mahoning mine, one of the largest open pit mines in the Lake Superior district, which was among those included in the sale of the Midvale properties to the Bethlehem corporation.

Pickands, Mather started shipping in 1923 from the Scranton mine as an open pit, the complete stripping of which involves the removal of 15,000,000 cubic yards of overburden. The overburden is particularly heavy, the depth averaging 100 feet. The Scranton formerly was operated as an underground mine.

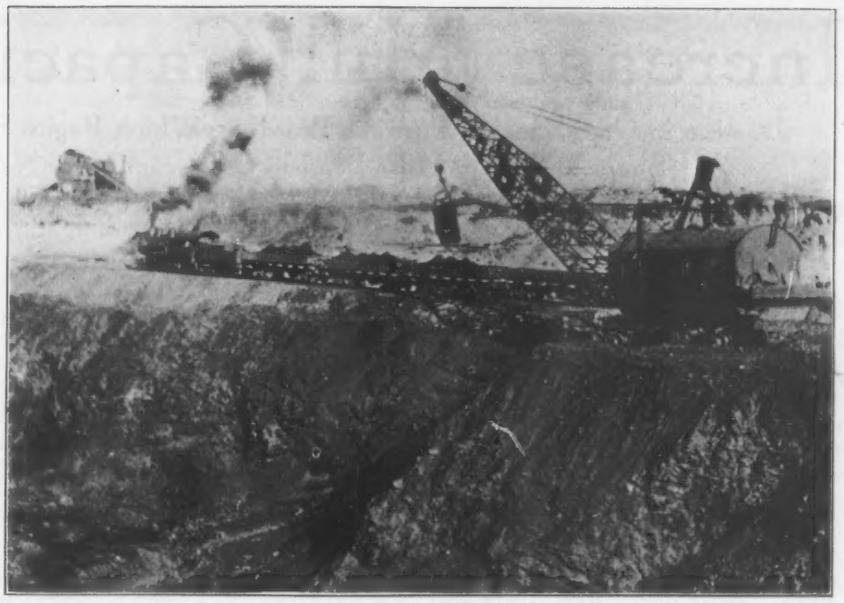
Shipments were started from the Andrew Young mine, Menominee range; this mine being renamed the Buck after C. A. Buck, vice president of the Bethlehem corporation. This is a good size mine, being developed from the eighth level of the Baltic and fourth level of the Fogarty, the ore being taken out through these shafts. Shipments also were started by Pickands, Mather from the Siphon mine in Michigan.

The Oliver company has developed the Missabe Mountain, owned by the state, into one of the most important mines of the Mesabi range. It has stripped the mine of millions of tons of overburden, shipped over 3,000,000 tons of ore last year and has prepared for a much larger volume.

The Steel corporation's mining subsidiary is spending about $150,000 this winter in electrifying the Soudan mine, Vermillion range. This is the oldest iron mine in Minnesota, having shipped ore steadily since 1884.

The power is to be obtained from a new hydroelectric plant recently built by the Phoenix Utility Co., which is part of an electric power system now reaching across the Vermillion and the Mesabi ranges, and supplying current to many mining enterprises.

John A. Savage & Co. continued stripping and construction through the year



SAGAMORE MINE OF JOHN A. SAVAGE & CO., NOW ONE OF THE LARGEST PRODUCERS ON THE CUYUNA RANGE. A THIRD UNIT HAS BEEN ADDED TO THE CRUSHING, DRYING AND SCREENING PLANT. THE SHOVEL IN THE FOREGROUND IS OF THE LATEST 350-TON TYPE

at the Sagamore mine on the Cuyuna range. A third unit was added to the crushing, drying and screening plant, which now has a daily capacity of 200 cars. The pit ore, which runs over 10 per cent in manganese, contains over 20 per cent moisture and a large percentage of chunks. It is first crushed and dried to about 10 per cent moisture, and then it passes over 8 mesh hummers, through which there is a powerful suction as in vacuum cleaning. About 7 per cent of the total ore is taken out and passed through a simple wet dust catcher.

During the winter a thickener and filters will be installed, so that the fines will be returned to the shipping bins as fast as made. The resultant mixture of seven parts of filter cake, at not over 25 per cent moisture, and 93 parts at 10 per cent, gives an average of about 11 per cent, or one-half the original moisture. The drying process does not change the original sieve test.

The ore body averages about 5 per cent in alumina and under 5 per cent in silica. It is believed that the alumina causes the high moisture. This season's shipments were 150,000 tons, and beginning with 1924 the mine will have a larger capacity.

A feature this season has been the setting up in the ore pit of a newly designed 350-ton electric shovel. It is operated by one man, and a 90-foot boom and a 6-yard dipper. This shovel will load ore only, while an electric drag line and sand pump will continue the stripping, which is now well ahead of mining.

The Oliver company installed the first unit of a crushing plant in the Hull-Rust pit, with a pan conveyor 8 feet wide and 93 feet long, feeding lump ore to a 48 x 60-inch jaw crusher. The crushed ore is conveyed to a shipping pocket on a belt 36 inches wide and 60 feet in length.

The company also is building a permanent crushing and screening plant near Virginia, Minn., to serve the Missabe Mountain and other mines in that district. The plant will have a capacity of 1800 tons an hour and will be ready for operation in 1924.

A large amount of new equipment was purchased by the Oliver company in 1923. For the Hibbing district alone there were six new locomotives, and for the Hull-Rust pit two 350-ton shovels, built to Oliver specifications. The company mounted 10 standard railroad type steamshovels on caterpillars, and purchased three 50-ton steamshovels on caterpillars for cleaning up pits. One hundred additional 30-yard stripping cars were purchased. The company made initial shipment from the Little-Prindle mine Mesabi range, of more than 1,000,000 tons of ore. The Sweeney mine, in the Hibbing district was exhausted in 1923. Open pit ore at the Pennington mine, one of the oldest mines on the Cuyuna range, operated by Tod-Stambaugh Co., also was mined out last year.

The Marquette Ore Co.'s Maroco mine on the Cuyuna range completed its second season by shipping 223,000 tons and is now employing full crews double shift to extend its stripped area. It plans to add to its present washing plant capacity before opening of navigation. At its Mary Charlotte mine at Negaunee, Mich., the company has replaced its wooden headframe with a modern steel structure.

Increase Mill Capacity in 1923

Decline in Open-Hearth Furnace Building, Which Began Six Years Ago, Is Checked—Sheet and Strip Mills Lead in Construction of New Rolling Units—Proposed Additions Are Extensive

BY JOHN D. KNOX

EXPANSION in the steelmaking and rolling mill industry in the United States during 1923 was of a slightly larger character than was recorded the year previous but fell far short from the standpoint of latitude of construction programs executed annually for the past decade. New open hearths available for steel production during the year just closed numbered eight, surpassing the total laid down in 1922 by a single unit. Rolling mill construction for 1923, however, commanded a more favorable position compared with annual building programs dating back to 1914. In this connection 171 mills adapted to the rolling of various steel commodities were laid down last year compared with 46 completed in 1922, 185 in 1921, 241 in 1920 and 50 during the previous year. While 1922 was barren of new blast furnace construction, one stack was included in 1923 extensions. Little progress was made last year in by-product coke oven expansion when only 48 units were completed. Prospects for a better showing this year, however, are 93 per cent more promising in view of 684 units now being in the course of construction.

Steelworks furnaces under construction at the beginning of this year totaled 16 with a rated annual output of 1,110,000 tons. This compares with 44 units which were included in the building program at the beginning of 1923 and promised 1,030,000 tons annually to the national ingot capacity. Open hearths scheduled for construction at the opening of 1922 aggregated four with an estimated yield of 280,000 tons annually while those slated for completion during 1921 totaled 12 with an annual output of 665,000 tons. Units in the course of construction on Jan. 1, 1920 numbered 25 and promised 1,392,000 tons additional to steelmaking capacity in this country. One year previous the number of steel melting units being built was 12 having a total rated capacity of 1,005,000 tons while 27 open hearths designed to yield 1,530,000 tons annually were included in the steelworks' expansion program of 1918. This compares with 95 open hearths with a combined yearly output of 4,795,500 tons which were listed for construction at the outset of 1917.

The total number of open-hearth furnaces built each year from 1913 to the beginning of 1924 together with the gross annual tonnages, which have augmented the estimated ingot capacity of America's steel industry, are recorded as follows:

Year	No. of furnaces	Gross tons	National ingot cap.
1923	8	535,000	55,019,000
1922	7	364,000	54,484,000
1921	13	620,000	54,120,000
1920	26	1,268,000	53,500,000
1919	23	1,871,000	52,200,000
1918	39	2,192,500	50,500,000
1917	102	5,413,000	48,500,000
1916	105	4,300,000	43,000,000
1915	43	1,759,000	39,000,000
1914	9	507,000	37,500,000
1913	62	3,120,000	37,000,000

Regenerative furnaces completed during 1923 together with the resultant yield of steel ingot capacity are listed by respective companies in Table II.

Table I

Recapitulation

	Completed 1923	Building 1923
By-product ovens	48	684
Blast furnaces	1	2
Open hearths	8	16
Rolling mills:		
Bar	2	..
Bar, muck	..	1
Blooming	2	3
Merchant	4	2
Plate	1	—
Rod	4	..
Rerolling	..	1
Roughing	3	..
Sheet bar	2	1
Sheet, cold	51	..
Sheet, hot	49	..
Skelp	1	..
Strip, cold	38	5
Strip, hot	2	..
Tube, buttweld	5	4
Tube, lapweld	4	..
Tube, seamless	2	..
Universal	1	..
Total rolling mills	171	17
Electric furnaces:		
Booth	1	0
Greaves-Etchells	2	0
Heroult	5	0
Ludlum	1	0
Moore	4	0
Total electric furnaces	13	0

The compilation, as shown, includes eight units, 62 per cent of which are of 100 tons or larger capacity. By the completion of these units the ingot-making capacity of this country has been enlarged 535,000 tons. Compared with statistics of the past 11 years, therefore, 1923 ranks as the third lowest productive year from the standpoint of tonnage furnished by open-hearth building programs. The leanest year from the standpoint of tonnage afforded by new open-hearth construction was 1922 when 364,000 tons of ingots were added to the capacity of this country as the result of the completion of seven furnaces. The second minimum record of new open-hearth capacity occurred in 1914 when 507,000 tons was afforded by the initial campaign of nine furnaces.

During 1917 new open-hearth construction supplied in excess of 5,000,000 tons of ingot capacity, extensions in this direction as will be recalled, being aggravated by the urgent demand for war materials. Since then, however, the enlargement of the national ingot capacity has shown a decrement each year and the decline in this direction for 1921 and 1922 stands out in bold relief compared with the peak of open-hearth capacity laid down in 1917. The shrinkage, however, was curbed last year when the tonnage afforded by the completion of new open hearths turned the figures upward. As shown in Table II eight open hearths with a combined annual rating 535,000 tons were placed in service for the first time. This tonnage represents an increase of about 31 per cent compared with the gross tonnage furnished by the seven new units completed during 1922 but is approximately 14 per cent less than the tonnage supplied by the expansion program of 1921.

Construction of new steelmaking capacity last year with an aggregate yield of 535,000 tons advances the estimated total steel ingot capacity of the United States well above 55,000,000 tons. Eleven years ago the ingot producing capacity of this country was estimated by IRON TRADE REVIEW at 37,000,000 gross tons. From Jan. 1, 1914 to Jan. 1, 1924 ingot capacity of the United States, therefore, has increased 18,019,000 tons or 48.7 per cent during a period of 10 years. Increase in open-hearth capacity during the first five years of this decade amounted to 71 per cent while the latter half of this period accounts for 29 per cent of the total enlargement in this direction.

As shown in Table VIII, 48 new coke ovens of the by-product type were completed during 1923, 37 per cent of which are operated in conjunction with steel plants. The total number of units placed in operation add 301,600 tons to the coking capacity of this country. This is a decline of 49.5 per cent compared with the 597,300 tons which were furnished by 133 by-product units lighted

for the first time in 1922. The building program the year previous included 283 ovens of this type affording 1,315,000 tons additional. New ovens of the regenerative type completed during 1920 numbered 1213 with a combined coking capacity of 5,840,150 tons. By-product units, which were installed during 1919, amounted to 783 and supplied 3,483,500 tons to the national output. New coking capacity placed in operation last year, therefore, was 49.5 per cent less than was completed during 1922, 77 per cent less than in 1921, 94 per cent less than in 1920, and 91 per cent less than in 1919.

Coke ovens of the by-product type in this country May 1, 1921 according to a list compiled in the "A B C of Iron and Steel" totaled 11,396. With the completion of 283 new units during 1921, 133 during 1922 and 48 during 1923 the actual number of by-product ovens in the United States at the beginning of this year stood at 11,860, their annual coking capacity approximating 46,111,980 tons. At the beginning of 1924, as shown in Table IX, 684 by-product coke ovens were under construction with a combined coking capacity exceeding 4,000,000 tons annually. Of the total number of ovens of this type in the course of erection, 621 or 91 per cent representing an annual output of 3,900,000 tons, will serve the steel industry directly while 63 units or 9 per cent promising about 400,000 tons of by-product coke annually are being laid down by companies not identified with the steel industry. An interesting sidelight in connection with the new by-product coke installations is that 33 units are being erected in Utah which marks the initial entrance of this industry into western territory.

Pig iron capacity completed during 1923, as shown in Table IV, was confined to one stack which increased the annual estimated pig iron capacity of the United States 155,250 tons. During the past two decades there have only been two years, 1914 and 1922, in which no blast furnaces were constructed in this country while 1921 was the only year during the same period in which the completion of one stack was recorded. Pig iron capacities in gross tons of all new stacks placed in blast each year from 1905 to 1923 inclusive, may be compared in the following table:

1923	155,250
1922	None
1921	207,000
1920	1,138,500
1919	396,750
1918	1,425,000
1917	2,182,500
1916	530,000
1915	530,000
1914	None
1913	550,000
1912	1,000,000
1911	565,000
1910	1,794,000
1909	1,930,000
1908	1,188,000
1907	2,065,000
1906	1,135,000
1905	1,292,000

Blast furnaces under construction at the beginning of 1924, as shown in Table

Equipment Completed or Building During 1923

Table II

Open Hearths Completed During 1923

Company	No. of furnaces	Rated capacity tons	Annual capacity tons
Bethlehem Steel Co., Sparrows Point, Md.	1	200	120,000
Bethlehem Steel Co., Sparrows Point, Md.	4	100	280,000
Columbia Steel Corp., Pittsburg, Cal.	2	75	100,000
Kansas City Bolt & Nut Co., Kansas City, Nebr.	1	50	35,000
Total	8		535,000

Table III

Open Hearths Building Dec. 31, 1923

Company	No. of furnaces	Rated capacity tons	Annual capacity tons
Carnegie Steel Co., Edgar Thomson Works	2	100	140,000
Inland Steel Co., Indiana Harbor, Ind.	4	100	280,000
Otis Steel Co., Cleveland	4	100	280,000
Republic Iron & Steel Co., Youngstown, O.	1	85	60,000
Wisconsin Steel Co., S. Chicago, Ill.	5	100	350,000
Total	16		1,110,000

Table IV

Blast Furnaces Completed During 1923

Company	No. of furnaces	Daily capacity tons	Annual capacity tons
Witherbee, Sherman & Co., Port Henry, N. Y.	1	450	155,250

Table V

Blast Furnaces Building Dec. 31, 1923

Company	No. of furnaces	Daily capacity tons	Annual capacity tons
Central Steel Co., Massillon, O.	†1	500	172,500
Columbia Steel Corp., Provo, Uta[1].	1	350	120,750
Mystic Iron Works, Everett, Mass.	†1	500	.....
St. Louis Coke & Chemical Co., Granite City, Ill., or American Coke & Chemical Co.	†1	500	.....
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	*1	600	207,000
Total	2		327,750

*Authorized.
†Projected.

Table VI

Stacks Remodeled During 1923

Company	Number or Name
Cranberry Furnace Co., Johnson City, Tenn	Cranberry
Cumberland Coal & Iron Co., Dayton, Tenn.	1 and 2
Sharpsville Furnace Co., Sharpsville, Pa.	Sharpsville
Witherbee, Sherman & Co., Port Henry, N. Y.	No. 1

Table VII

Stacks Being Remodeled Dec. 31, 1923

Company	Number or Name
American Steel & Wire Co., Cleveland	"A"
Carnegie Steel Co., Duquesne Works	No. 1
Kelly Nail & Iron Co., Ironton	Sarah
McKinney Steel Co.	Nos. 1 and 2
Minnesota Steel Co.	No. 1
Perry Iron Co., Erie, Pa.	Perry
Republic Iron & Steel Co.	No. 3 Haselton
Tonawanda Iron Corp., North Tonawanda, N. Y.	Niagara "A"
Youngstown Sheet & Tube Co., S. Chicago, Ill.	No. 5

Table VIII

By-Product Ovens Completed in 1923

Company	No. of ovens	Type of ovens	Est. annual coking cap., tons
Battle Creek Gas Co., Battle Creek, Mich.	11	*Koppers	69,100
Weirton Steel Co., Weirton, W. Va.	37	*Koppers	232,500
Total	48		301,600

*Becker type combination oven.

Table IX

Ovens Building Dec. 31, 1923

Company	No. of ovens	Type of ovens	Est. annual coking cap., tons
Bethlehem Steel Co., Buffalo	114	*Koppers	716,300
Carnegie Steel Co., Clairton, Pa.	366	*Koppers	2,299,500
Columbia Steel Corp., Provo, Utah	33	*Koppers	207,300
Consumers Power Co., Zilwaukee, Mich.	19	*Koppers	119,400
Diamond Alkali Co., Alkali, O.	23	*Koppers	144,500
Republic Iron & Steel Co., Youngstown, O.	61	*Koppers	383,300
Trumbull Cliffs Furnace Co., Warren, O.	47	*Koppers	295,300
Utica Gas & Electric Co., Utica, N. Y.	21	*Koppers	131,900
Total	684		4,297,500

*Becker type combination oven.

V, included a 350-ton stack at Provo, Utah and is the first stack to be laid down in western fields in many years. A 600-ton stack, however, has been authorized by the directors of the Youngstown Sheet & Tube Co. for construction at Indiana Harbor, Ind. and actual work is expected to begin early this year. These two units when completed will enlarge the pig iron producing capacity of this country 327,750 tons annually. Construction plans still in the formative state include a 500-ton stack for erection at Everett, Mass; one of similar daily capacity for erection at Granite City, Ill.; and one at Massillon, O. Stacks remodeled during the year just closed numbered five and included Nos. 1 and 2 of the Cumberland Coal & Iron Co., Dayton, Tenn; one stack of the Sharpsville Furnace Co., Sharpsville, Pa; the Cranberry stack at Johnson City, Tenn; and the No. 1 stack of Witherbee, Sherman & Co., Port Henry, N. Y. Reconstruction work now is in progress at the Erie, Pa. stack of the Perry Iron Co.; on the Sarah stack of the Kelly Nail & Iron Co., Ironton, O.; on the No. 1 stack of the Minnesota Steel Co., Duluth, Minn.; on the No. 3 Haselton furnace of the Republic Iron & Steel Co., Youngstown, O.; on the Nos. 1 and 2 River furnaces of the McKinney Steel Co., Cleveland; and on the No. 5 furnace of the Youngstown Sheet & Tube Co., South Chicago, Ill.; "A" furnace of the American Steel & Wire Co., Cleveland; and No. 1 stack of the Carnegie Steel Co. at Duquesne.

Records of the past year show four obsolete stacks in this country were dismantled or that work in this direction had been started. The Republic Iron & Steel Co. scrapped its Hall furnace at Sharon, Pa. which began its original campaign in 1845. The Lawrence furnace at Culbertson, O., of the Marting Iron & Steel Co., which was burdened for the last time during 1920, also was salvaged. This unit was built in 1890 and had an annual capacity of 70,000 tons of iron. The Marshall furnace of the Juniata Furnace & Foundry Co., at Newport, Pa., which was built in 1871, also was dismantled while at the close of 1923 dismantling work had been started on the No. 4 stack of the Shenango Furnace Co., Sharpsville, Pa.

At least 38 blast furnaces in the United States changed hands during 1923 either by direct purchase or through consolidation. In this connection the American Radiator Co. purchased two stacks at Tonawanda, N. Y. from the Donner Steel Co. to insure a sufficient supply of metal to meet its requirements, while the Reading Iron Co. bought the five stacks of the Thomas Iron Co., two of which are located at Hokendauqua, Pa., one at Hellertown, Pa., and two at Alburtis, Pa. Through the medium of consolidation nine stacks of the Lackawanna Steel Co., Buffalo, and 11 stacks of the Cambria Steel Co., Johnstown, Pa. passed to the control of the Bethlehem Steel Co. while the Youngstown Sheet & Tube Co. acquired control by the same means of three stacks of the Brier Hill Steel Co., Youngstown, O., and eight stacks of the Steel & Tube Co. of America.

Miscellaneous equipment installed at iron and steel plants in this country during the year just closed included a turbo-generator rated at 10,000 kilowatts, two slab heating furnaces, nine annealing furnaces, six soaking pits and three 834-horsepower boilers at the Lakeside division of the Otis Steel Co., Cleveland; an oil-fired continuous heating furnace at the Nagle Steel Co., Pottstown, Pa.; two 600-horsepower boilers at the Fitzsimons Co., Youngstown, O.; two 1050-horsepower boilers at the Page Steel & Wire Co., Monessen, Pa.; an 8 x 20-foot heating furnace and two 600-horse-

Equipment Completed or Building in 1923

Table X

RollingMills Completed During 1923

Company	No. mills	Type mill
American Chain Co., Bridgeport, Conn..	1	rod
American Rolling Mill Co., Ashland, Ky.	6	30" hot sheet
American Rolling Mill Co., Ashland, Ky.	20	26" cold sheet
Atlas Steel Corp., Dunkirk, N. Y....	1	20" blooming
Bethlehem Steel Co., Sparrows Point, Md.	2	26" cold sheet
Bryden Neverslip Co., Catasauqua, Pa.	1	9" bar
Bryden Neverslip Co., Catasauqua, Pa.	1	10" bar
Chapman-Price Steel Co. Indianapolis..	1	28" hot sheet
Columbia Steel Corp., Pittsburg, Cal..	1	12" rod
Columbia Steel Corp., Pittsburg, Cal..	4	30" hot sheet
Falcon Steel Co., Niles, O.....	5	26" cold sheet
Fairfield Steel Co., Fairfield, Ala.....	1	11" merchant
Firth-Sterling Steel Co., McKeesport, Pa.	1	10" merchant
Jessop Steel Co., Washington, Pa.....	1	12" roughing
*La Belle Iron Works, Steubenville, O.	1	35" blooming
*La Belle Iron Works, Steubenville, O.	1	19" sheet bar
Metal & Thermit Corp., S. San Francisco	6	30" hot sheet
Metal & Thermit Corp., S. San Francisco	2	26" cold sheet
Michigan Steel Corp., Detroit.....	6	28" hot sheet
Michigan Steel Corp., Detroit.....	6	26" cold sheet
National Enameling & Stamping Co., Granite City, Ill.	6	28" hot sheet
National Enameling & Stamping Co., Granite City, Ill.	1	72" jobbing
National Enameling & Stamping Co., Granite City, Ill.	4	24" cold sheet
National Enameling & Stamping Co., Granite City, Ill.	1	34" plate
National Tube Co., Gary, Ind.....	5	buttweld tube
National Tube Co., Gary, Ind.....	4	lapweld tube
National Tube Co., Gary, Ind.....	1	seamless tube
Newton Steel Co., Newton Falls, O....	10	28" hot sheet
Newton Steel Co., Newton Falls, O....	5	26" cold sheet
Oliver Iron & Steel Co., Wilson Station, Pa.	1	8" cold strip
Oliver Iron & Steel Co., Wilson Station, Pa.	2	10" cold strip
Oliver Iron & Steel Co., Wilson Station, Pa.	2	12" cold strip
Otis Steel Co., Cleveland.....	1	24" hot strip
Otis Steel Co., Cleveland.....	5	10" cold strip
Otis Steel Co., Cleveland.....	5	12" cold strip
Otis Steel Co., Cleveland.....	5	16" cold strip
Otis Steel Co., Cleveland.....	5	20" cold strip
Reading Iron Co., Reading, Pa.....	1	24" sheet bar
Reading Iron Co., Reading, Pa.....	1	18" skelp
*Roebling's, John A., Sons Co., Roebling, N. J.	1	rod
Seneca Iron & Steel Co., Buffalo.....	1	28" hot sheet
Sharon Steel Hoop Co., Youngstown, O.	3	26" cold sheet
Stanford Steel Products Co., Milford, Conn.	2	cold strip
Superior Steel Corp., Carnegie, Pa.....	1	20" cold strip
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.	1	12" merchant
Eastern Ohio Mfg. Co., Warren, O....	4	8" cold strip
Eastern Ohio Mfg. Co., Warren, O....	4	10" cold strip
Eastern Ohio Mfg. Co., Warren, O....	2	12" cold strip
Timken Roller Bearing Co., Canton, O..	1	16" roughing
Universal Steel Co., Bridgeville, Pa.....	1	22" roughing
Walsh & McGee Steel Co., Newark, N. J.	1	8" merchant
Weirton Steel Co., Weirton, W. Va....	8	30" hot sheet
Weirton Steel Co., Weirton, W. Va....	4	28" cold sheet
Weldless Tube Co., Wooster, O.....	1	seamless tube
West Leechburg Steel Co., Leechburg, Pa.	1	hot strip
Whitaker-Glessner Co., Portsmouth, O..	1	10" rod
*Youngstown Sheet & Tube Co., Youngstown, O.	1	universal
Total	171	

*Replacement.

Table XI

Rolling Mills Building Dec. 31, 1923

	No. mills	Type mill
American Puddled Iron Co., Warren, O.	1	24" muck bar
American Puddled Iron Co., Warren, O.	1	29" blooming
Erie Railroad, Kent, O.	1	rerolling
Ford Motor Co., Detroit.....	1	blooming
Ford Motor Co., Detroit.....	1	merchant
Inland Steel Co., Indiana Harbor, Ind.	1	14" merchant
Otis Steel Co., Cleveland.....	1	40" blooming
Otis Steel Co., Cleveland.....	1	24" sheet bar
*Republic Iron & Steel Co., Youngstown, O.	2	buttweld tube
West Leechburg Steel Co., Leechburg, Pa.	5	16" cold strip
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	2	buttweld
Total	17	

power boilers at the Ludlum Steel Co., Watervliet, N. Y.; a stone crushing plant at the quarries of Joseph E. Thropp Co., Everett, Pa.; a Brassert-type gas washer and Dorr-type thickener equipment at the Donner Steel Co.'s stacks at Buffalo; a 12,000,000 cubic foot liquid purification plant for purifying coke oven gas for use in the open-hearth department of the Pittsburgh Crucible Steel Co., Midland, Pa.; a sintering plant of the Greenawalt-type at the blast furnace property of Witherbee, Sherman & Co., Port Henry, N. Y.; a 30-pot crucible furnace at the Hunter Crucible Steel Co., Cleveland; a 10 x 45-foot heating furnace and two soaking pits at the National Enameling & Stamping Co., Granite City, Ill.; a 1000-horsepower sterling boiler, warehouse, and a machine and electric shop at the West Leechburg Steel Co., Leechburg, Pa.; existing boilers at the Kinkora plant of John A. Roebling's Sons Co., Roebling, N. J. having a combined capacity of 12,000 horsepower, were equipped with stokers and coal and ash handling apparatus; extension of 275 feet to the main sheet mill building and the installation of a Marsh-Cochran plant for reclaiming acid and copperas at the Youngstown, O. division of the Sharon Steel Hoop Co.; and an 8-stand rod mill designed especially for rolling nickel alloys built at new works of the Electric Alloy Co., Morristown, N. J.

Miscellaneous Equipment Constructed

Equipment in the process of erection at various iron and steel plants in this country at the end of 1923 included a coal crushing plant at the Colonial Iron Co., Riddlesburg, Pa.; three batteries of soaking pits with a holding capacity of 72 ingots at the Wisconsin Steel Co., South Chicago; a Cottrell-type electrical blast furnace gas cleaner at the Colorado Fuel & Iron Co., Pueblo, Colo.; four mechanical puddling furnaces of the rotary type, an annealing furnace of the car-bottom type, two heat-treating furnaces of the car-bottom type, seven open-side forging furnaces and two 500-horsepower sterling-type boilers equipped with Westinghouse stokers at the American Chain Co., Bridgeport, Conn.; four oiled-fired mechanical puddling furnaces of the Ford type and rated at 250 tons per 24 hours, a combination continuous and sand-bottom heating furnace equipped with recuperators of the Stein-Chapman type and a 200-horsepower boiler at the new plant of the American Puddled Iron Co., Warren, O.; electrification of billet and sheet bar mills and rebuilding of the bessemer plant including the installation of a new mixer at the Republic Iron & Steel Co., Youngstown, O.

Rolling mill construction included in the 1923 completion program, as shown in Tables I and X, totaled 171 units of various types, which is an increase of 73 per cent above the expansion of the previous year when 46 units were placed under power for their initial run. During 1921 there were 185 various type mills completed compared with 241 laid down in 1920 and 50 in the year previous. Attention again is attracted to the number of sheet mills involved in the program of finishing mill construction together with additional expansion in the strip industry. Last year 49 units or about 29 per cent of the total mills completed were devoted to the hot rolling of sheets. During 1922 the number of hot sheet mills built reached 18 while during the preceding year 59 hot sheet mills were added. During 1920 new hot sheet mills scheduled reached 82 compared with 22 new units in 1919.

Table XII

New Electric Furnaces Operated in 1923

Booth	No. of units	Size tons
Mosler Safe Co., Hamilton, O. Greaves-Etchells	1	2
Ford Motor Co., Detroit..... Ludlum	2	10
Ludlum Steel Co., Watervliet, N. Y. ..... Moore	1	5
Blackwood Electric Steel Corp., Parkersburg, W. Va.....	1	3
Dayton Steel Foundry Co, Dayton, O.	1	3
Pittsburgh Valve & Construction Co., Pittsburgh	1	3
Texas Steel Mills, S. Fort Worth, Tex. ..... Heroult	1	3
Damascus Crucible Steel Co., Hammond, Ind.	1	2
Lorain Steel Co., Johnstown, Pa.	2	3
Pettibone-Mulliken Co., Chicago	2	3
Total completed Dec. 31, 1923	13	

At the close of 1923 cold sheet mills added to various finishing departments in this country numbered 51, this being equivalent to 29 per cent of all types of mills completed during the past 12 months. The construction program of 1922 included the completion of five cold sheet mills while that of the year previous accounted for 44. During 1920 the number of cold finishing units reached 87 compared with but a single stand of cold rolls in 1919. Expansion of cold finishing capacity in the sheet industry during 1923, therefore, is the second highest in the last half decade.

Many interesting deductions may be made by referring to Table X. In the first place eight new hot sheet mills were completed by the Weirton Steel Co., Weirton, W. Va., which marks its initial entry into the sheetmaking industry. Heretofore its line of products was confined solely to tin plate and strip steel. Then again, completion of six hot sheet mills in the center of the automotive producing field by the Michigan Steel Corp. gives to Detroit its first sheet manufacturing plant. One-third of the total of hot sheet mills finished during 1923 are designed for the production of high-grade stock. Another interesting highlight is that prior to 1923, the sheet plant which occupied the most western location, was at Granite City, Ill., but since then the sheet industry has spread out its western confine to the Pacific coast by the recent identification of the Columbia Steel Corp., with four hot sheet mills at Pittsburgh, Cal., and the Metal & Thermit Corp., with six hot sheet mills at South San Francisco, Cal.

Standing of Sheetmakers Changes

In the Mahoning valley, which is the largest sheet producing district in the United States, if not in the world, the rank of the seven manufacturers of steel sheets with mills in Youngstown, Niles and Warren, O., has been shifted as a result of 10 new hot mills having been added in 1923 by the Newton Steel Co. Completion of these new units advances the position of the Newton company from the fifth to the second largest sheet producer in that district and in addition increases the number of hot sheet mills in the valley from 110 to 120.

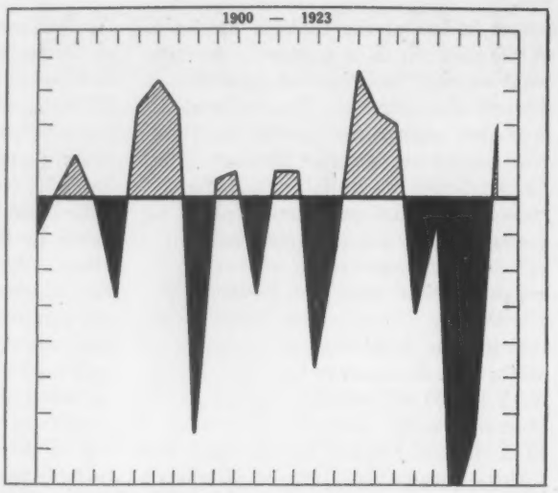
That the expansion in the strip steel industry has been keeping pace with the increasing demand for the product is mirrored by the new installations completed in 1923 as well as new equipment added during the two previous years. Two new hot strip mills started on production last year while the number of cold strip units placed under power aggregated 38 or 22 per cent of all types of rolling mills completed. Two years ago 14 cold strip mills were laid down while in 1921 the industry claimed 41 new units. During the past three years, therefore, six hot strip mills and 93 units devoted to cold strip production have been placed in operation. The most recent steelmaker to become identified with the strip industry is the Otis Steel Co., Cleveland which completed one hot and 20 mills for the working of strip steel in the cold state.

New electric furnaces, which began melting for the production of steel castings or ingots during 1923, included 13. Expansion during 1922 included 16 new electric furnaces, while during the previous year 13 were recorded. This compares with 34 melting units completed in 1920, 53 in 1919, 54 in 1918, and 192 in the three preceding years.

1923 Conservatism Lays Firm Trade Basis for 1924

Present Outlook Is for Normal Trade Volumes In the Coming Months

BY JOHN W. HILL



Business Swings Since 1900 as Measured by Fluctuations of Pig Iron Output Above and Below Its Normal Line

THE course of events in 1923 has abundantly justified the great economic experiment attempted last spring. This involved bringing the business cycle under greater control and lessening the violence of its fluctuations. From great mountain peaks of activity early in the year business underwent a summer of mild recession and readjustment.

This led to the spread of excessive fears and apprehensions for the immediate future. The closing months of 1923, however, brought many signs of important improvement, both in industry and in sentiment. The New Year opens with every indication that a solid basis has been laid for prolongation of the period of well poised though not feverish prosperity. The wave of conservatism during 1923 averted another 1920, and all fears of a severe depression appear to have disappeared.

Among the more important evidences that conditions are sound and that faith in the outlook has been restored have been the increase in building construction, the buying movement of pig iron, quickening interest in steel, betterment in such lagging industries as copper, tires and petroleum, expansion plans announced by large automobile manufacturers, the buoyancy of the stock market since late in October and the flood of extra and increased dividends since early November.

President's Message a Factor

Improving business and investment confidence has received healthy stimulation from the sound and constructive message of President Coolidge before congress in December and in the prospects for sweeping reductions of the onerous tax burden along the lines laid down by Secretary of the Treasury Mellon.

Heavy industrial production in 1923, exceeding all former records in many industries, has filled up the great vacuum of goods created by the 1921 depression. The slackened pace of manufacture in the summer, combined with unprecedented consumption, prevented the accumulation of burdensome inventories, however. That is one of the most favorable factors in the outlook.

Buying Is Conservative

The past year has seen the development of a policy of week-to-week buying. This has resulted from buyers' conservatism, the stability of prices, the passing of shortages and the free movement of freight. Demand for some months to come most likely will be cut to the measure of current requirements, which in this country are enormous. For the present it seems that production has been brought well within the limits of these current needs, a healthy and well balanced condition.

Confidence in the outlook rests upon the additional solid bases of probable continued construction activity, remarkable railroad efficiency, improvement in the farmer's position and large credit resources and easy money. Building stimulated the recovery from 1921 and has been the backbone of prosperity since. The farmer's purchasing power has virtually been restored to normal. The diagrams in the Business Trend disclose these and many other significant trends in business development.

Great consumption in 1923 was made possible by widespread employment and rising wages. Employment may contract slightly in 1924 and the rising tide of wages probably will be checked. Industrial activities, however, should be sufficient to prevent important unemployment.

One of the most pressing problems confronting industry is that of high costs. Wages and other items of cost have advanced so rapidly during the year that profits have suffered in recent months. The tendency in the coming year will be to combat these high costs through increased efficiency, the wider use of labor saving machinery and more intensive sales efforts, rather than through deep wage reductions. The necessity of keeping costs in hand is all the more important due to the resistance to price advances and the prevailing stability of values. Competition promises to be much keener all along the line and margin of profit probably will be less.

The fact that 1924 will witness a presidential election has given rise to fear in some quarters that depression will result from this cause. Analysis of past presidential years explodes this theory as a myth. Bad times have not always accompanied those occasions. In Europe disturbing conditions are likely to continue, but America has sufficiently demonstrated her ability to prosper despite the shadows abroad.

Fair Business Predicted

In sum, the New Year offers the prospect of a fair degree of business activity, marked by keen competition, careful buying, steady prices, stationary wage levels, and an industrial production comparing, in totals, favorably with 1923. Normal and not feverish activities are likely, with conditions varied in different industries. The outlook beckons to enterprise and initiative. Their rewards should not be disappointing.

The Business Trend

For the Year of 1923

Iron Trade Review Charts Depict Great Activity

BUSINESS has closed a year of surpassing achievement and unquestioned prosperity. Despite huge activities, 1923 was notable for the sway of conservatism. This caution, reflected in the accompanying charts, gave balance to the economic situation and laid a firm basis for steady, though not feverish, trade in 1924. Constructive factors tending to stimulate industry, and adverse factors with an opposite influence are listed below.

Favorable

Confidence is increasing.

Credit resources are large.

Prices are relatively stable.

Tax reduction is in sight.

Wages, savings and purchasing power are high.

Building prospects are good.

Farm conditions are better; crop values are up 11 per cent over 1922.

Inventories are not generally excessive.

Improvement recently has come in a few lagging industries.

Securities have indicated confidence.

Profits and dividends are above 1922.

Railroad purchases are in prospect.

Unfavorable

Europe continues disturbed.

Industrial costs are excessive.

Business profits are narrowing.

A soft coal strike is possible.

Although better, the farmer's position is short of prosperity.

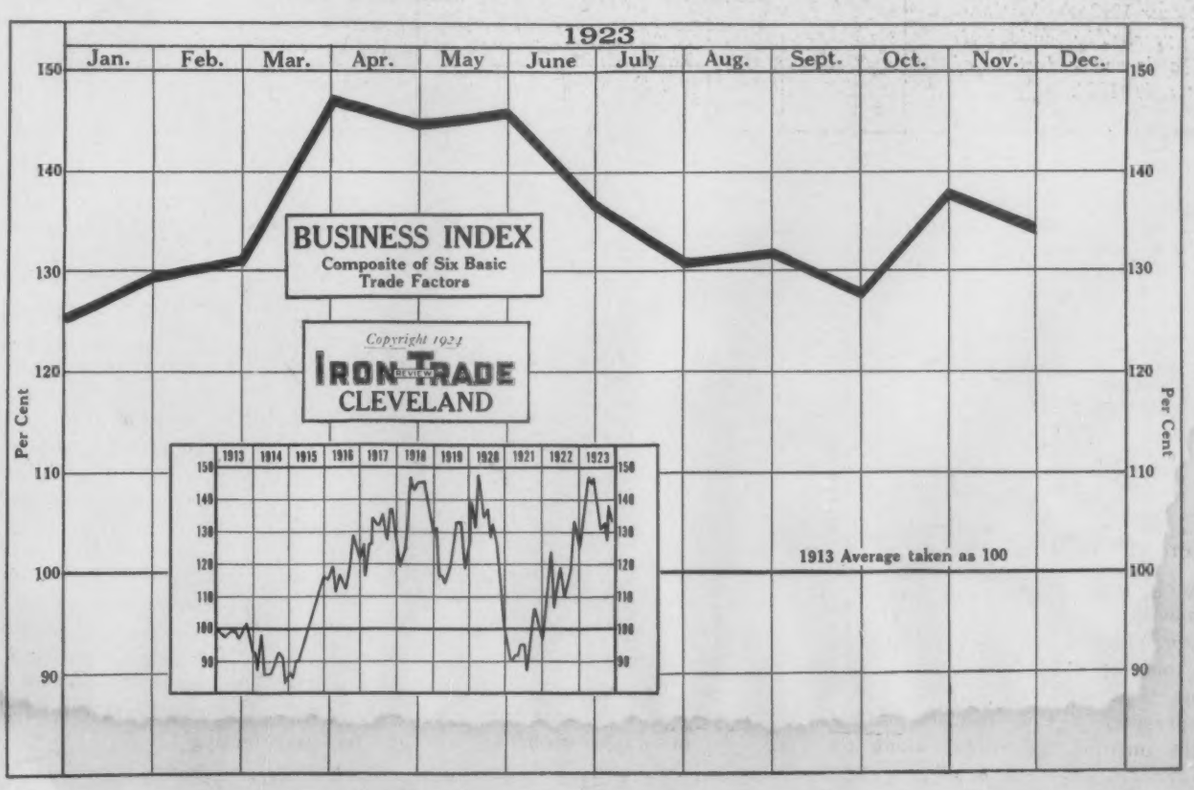
Over-supplies of oil, wheat, leather, coal and a few other lines exist.

Keen competition is ahead.

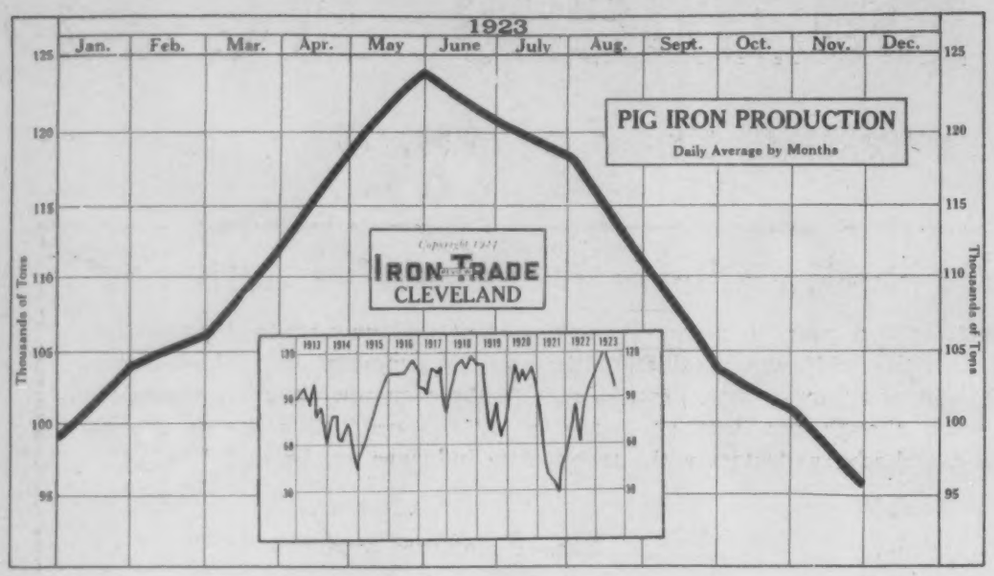
A presidential election is at hand.

A buyers' market prevails in many industries.

Soaring costs might choke the building boom.



The Business Trend for 1923

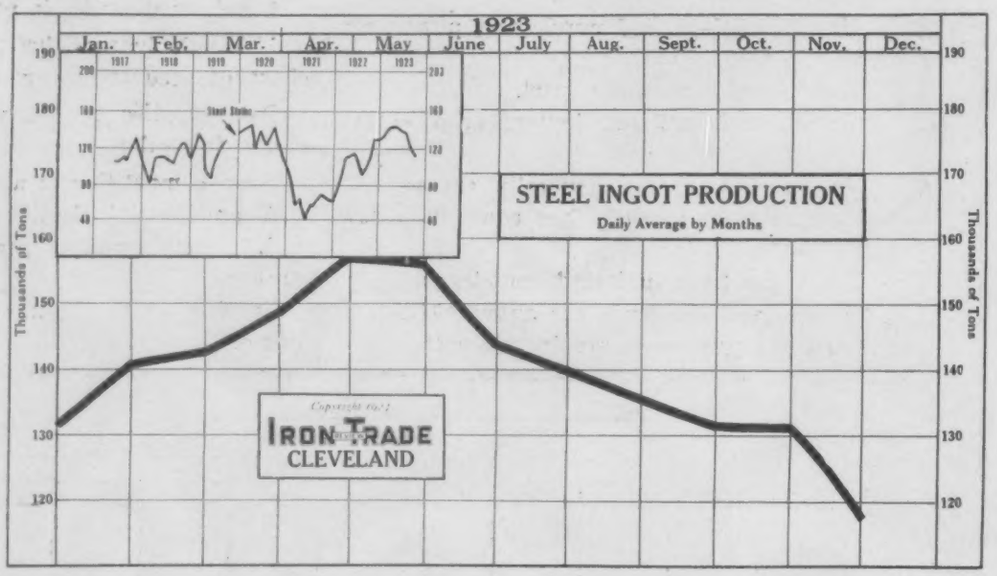


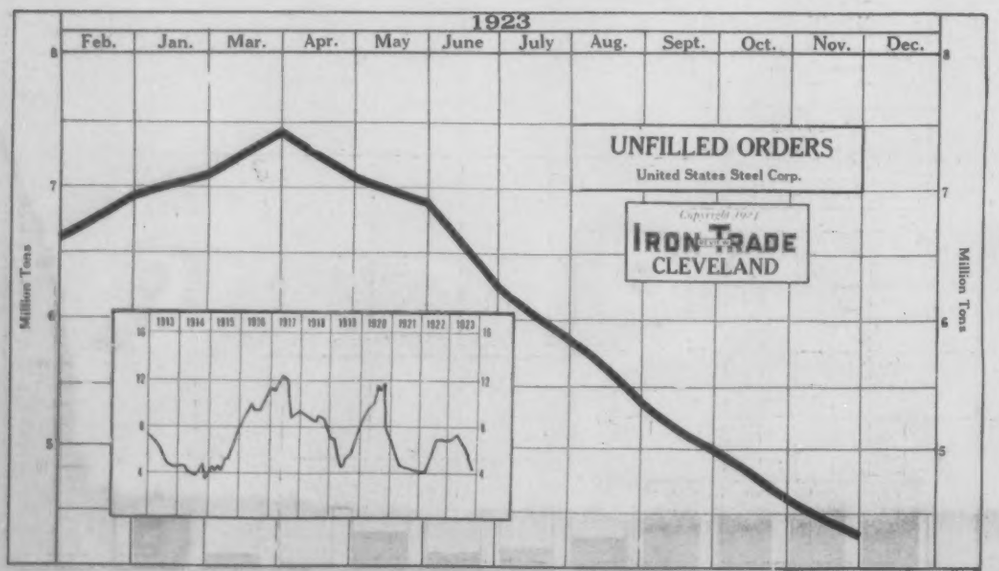
Pig Iron Output

PIG iron production in 1923 achieved a new high record in the annals of the industry. The total of approximately 40,100,000 tons exceeded the high war year of 1916. Output reached the monthly peak for all time in May with a daily average of 124,790 tons. From that point it dropped steadily in succeeding months. The November average per day was 22.8 per cent below the peak. Prices fell 35 per cent before buying started.

Ingot Output

THE output of steel ingots in 1923 approximated 43,380,000 tons. This was the largest for all time except for the war year of 1917. In April production attained an annual rate of 49,110,000 tons. In November the decline was 24 per cent from the peak. The year's total was 25 per cent over 1922; 63 per cent over 1921 and 43 per cent over 1912, the best pre-war year. The outlook is for a large production of ingots in 1924.





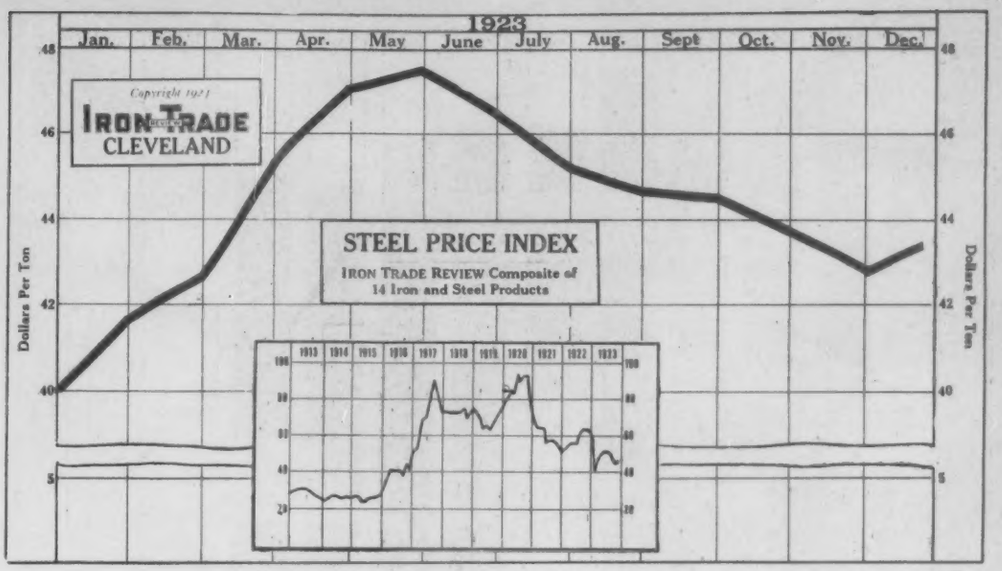
Unfilled Orders

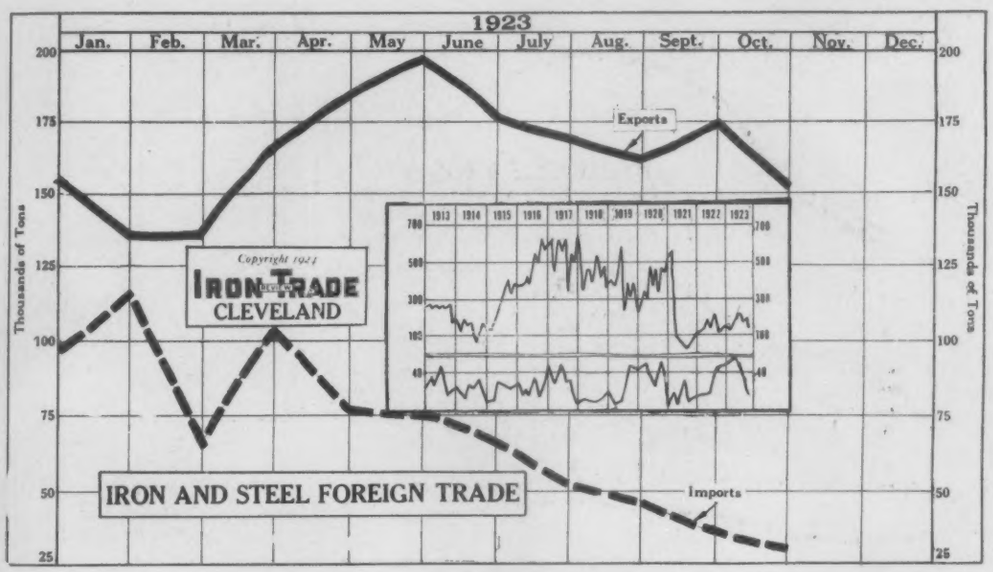
BOOKINGS of the United States Steel Corp., have been steadily falling since March. On Nov. 30 they were 43 per cent below the year's top. The total of 4,368,000 tons was only 5 per cent higher than the bottom of the 1921 depression. The decline in November of 304,241 tons was the smallest recession for any month since last May. Shipments have been exceeding orders by 25 per cent during the past few months.

The Business Trend for 1923

Steel Prices

IRON TRADE REVIEW'S composite market average of 14 iron and steel prices reached the high point for 1923 shortly after the middle of May. It was then 80 per cent above the 1913 level and 44 per cent above 1921 low. Pig iron prices weakened although finished prices held firm. After declining for about 30 weeks by 10 per cent to a level 62 per cent above 1913 the index stiffened in December. It has not advanced however.



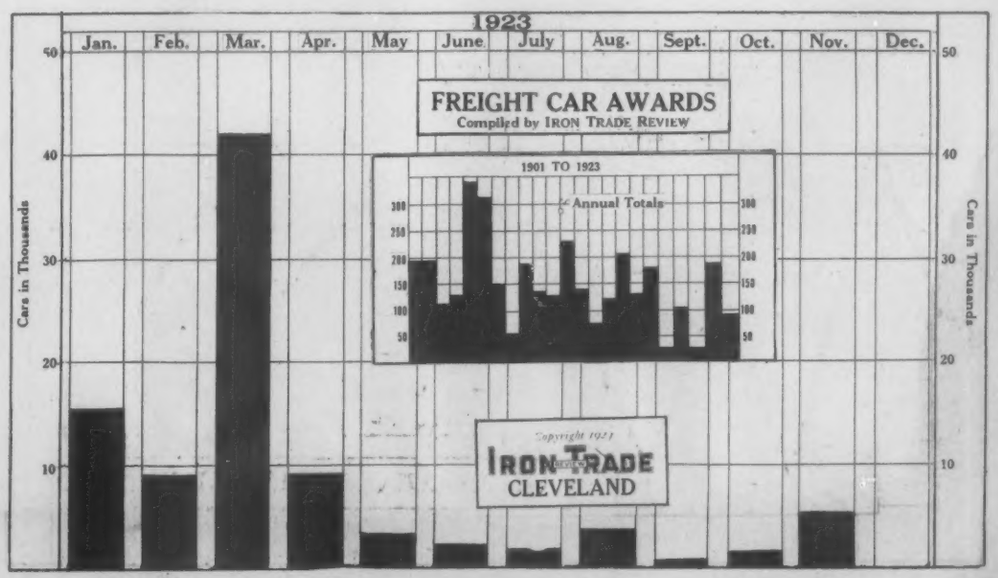


Steel Exports

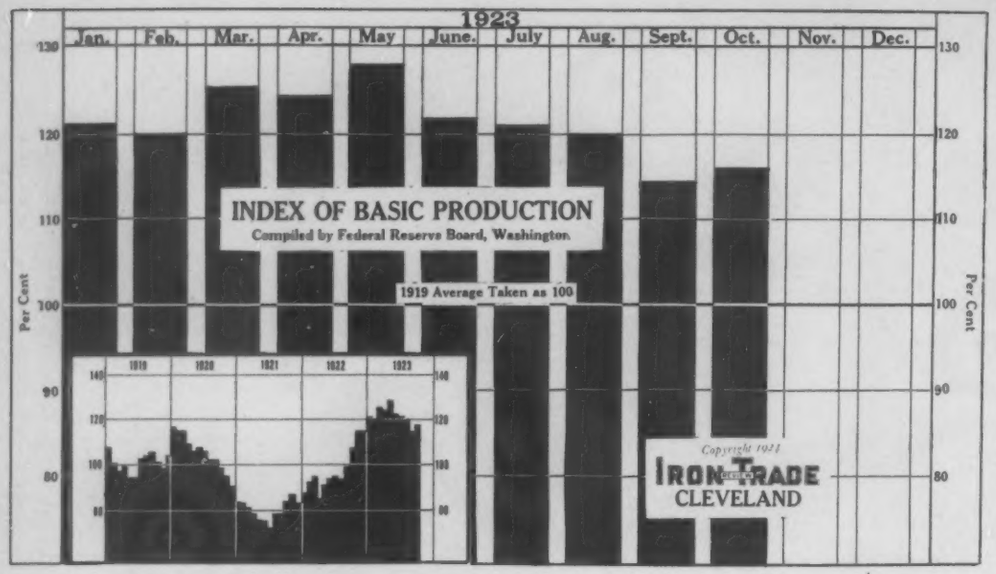
EXPORTS of iron and steel products for the first 10 months of 1923 show a monthly average of 166,000 tons against a monthly average of 172,000 tons in the same period of 1922. Imports have averaged 68,000 tons monthly against 47,500 tons in 1922. Monthly exports in 1923 average 26 per cent below those for 1913, while imports show a monthly average 146 per cent higher than 1913. The export outlook is only fair.

Car Awards

RAILROAD car buying in 1923 has lagged behind 1922. With that exception it has been the largest since 1918. The aggregate for 11 months was 91,886 cars against 157,210 in the corresponding period last year. In the closing weeks of 1923 negotiations for up to 100,000 cars were reported under way. The present large number of idle cars may delay large purchases of new cars. In the closing weeks of 1923 however, buying gained.



The Business Trend for 1923

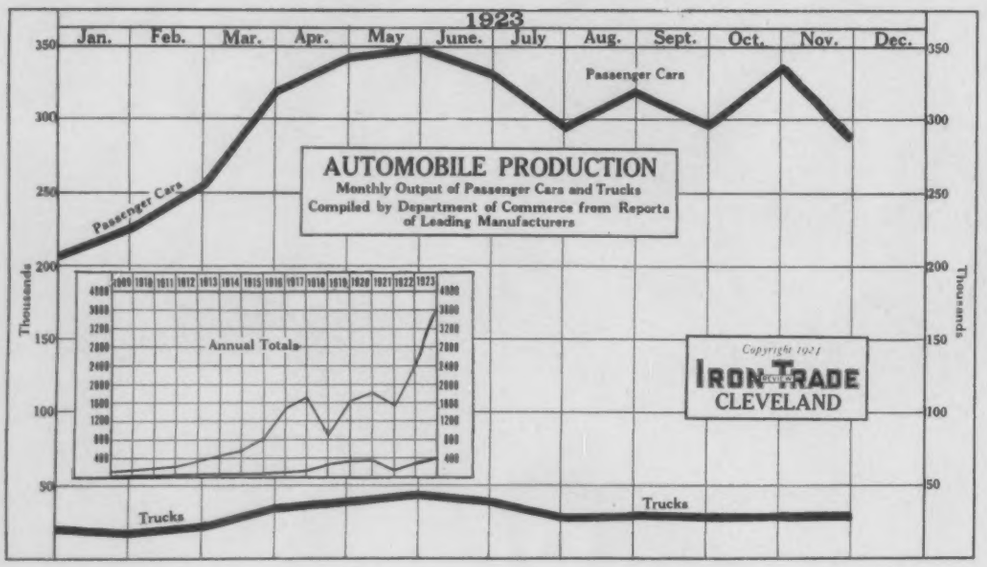


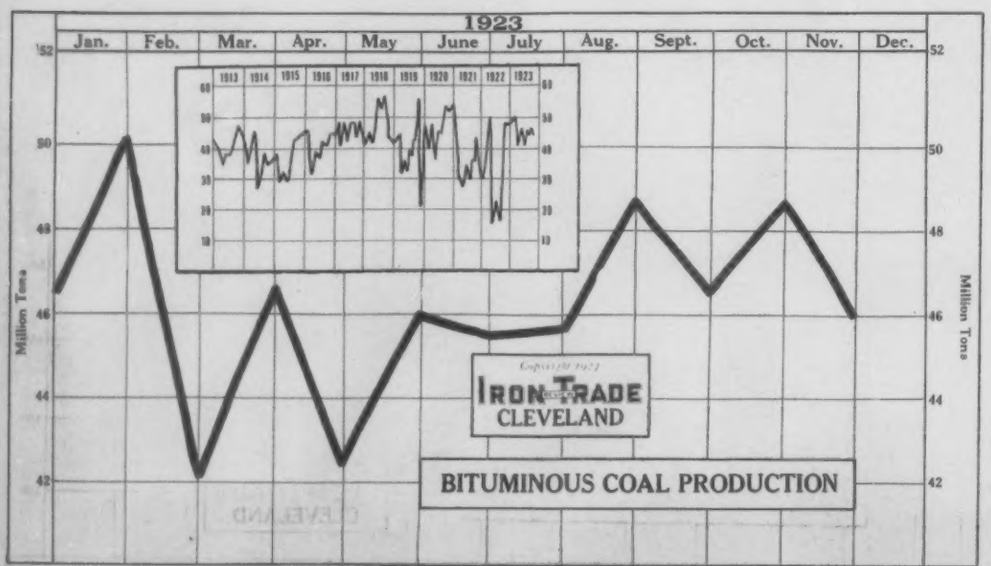
Basic Production

PRODUCTION of basic commodities reached the highest level in the country's history in 1923. *The index measuring basic output, compiled by the federal reserve board at Washington, touched its peak in May at* 28 *per cent above* 1919. *It was then* 10 *per cent above the top for* 1920. *The index declined* 10 *per cent through September and then gained slightly in October. Its average for the year was the highest ever recorded.*

Automobiles

DURING 1923 *approximately* 4,000,000 *passenger cars and trucks were manufactured in this country. That was a larger number than was made in all of the years of the industry from its birth until* 1916. *The year's total surpassed* 1922 *by* 50 *per cent. A number of big companies have announced plans to climb to new heights of output in* 1924. *The greatest month of the year was in May with* 393,000 *passenger cars and trucks.*





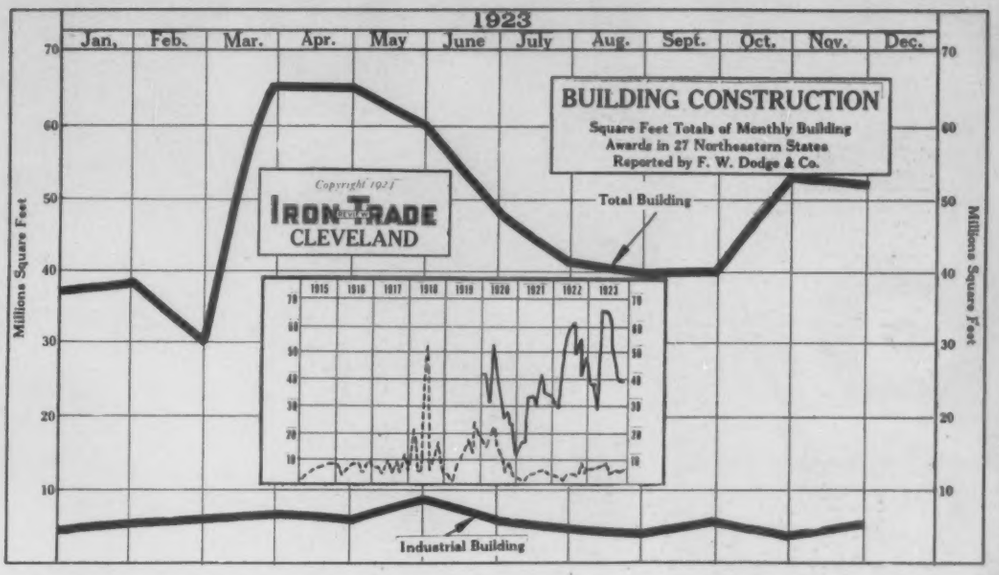
Bituminous Coal

MINE output of bituminous coal in 1923 *maintained a consistently high average. The year's aggregate of approximately* 545,000,000 *tons was the largest since* 1920. *It was* 34 *per cent greater than* 1922. *Free freight shipments have permitted good mine operations. Labor peace has prevailed in* 1923, *but a possible strike to enforce wage demands for soft coal miners is one of the shadows in the* 1924 *outlook.*

The Business Trend for 1923

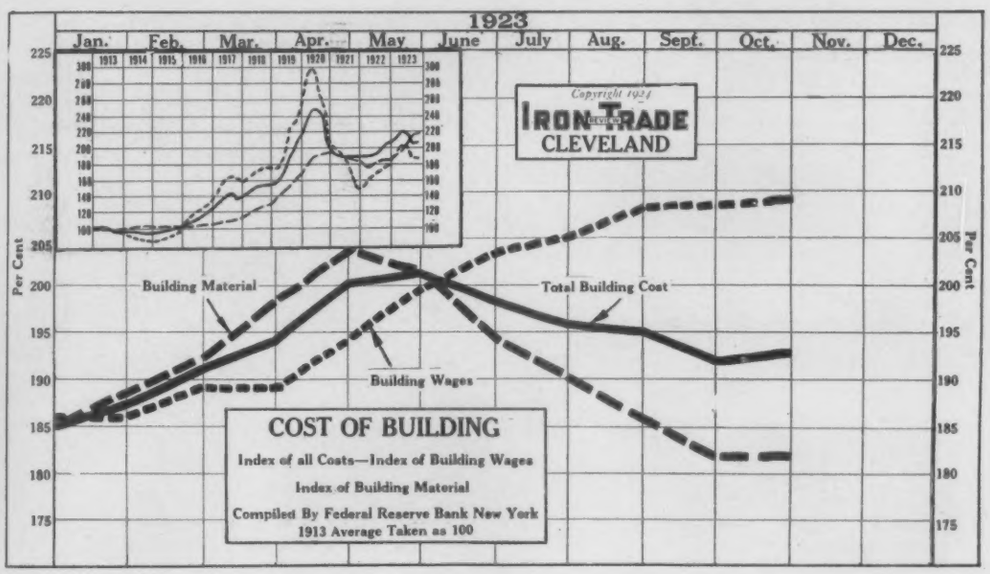
Construction

THE volume of new building in the United States achieved a new high record in 1923. The aggregate of awards as reported by the F. W. Dodge Corp. for 11 months was 549,700,000 square feet compared with 541,300,000 square feet in the same period of 1922. Industrial construction declined 6 per cent while residential building increased 3 per cent. Industrial building was only half of the 1920 record. This reflected last year's caution.



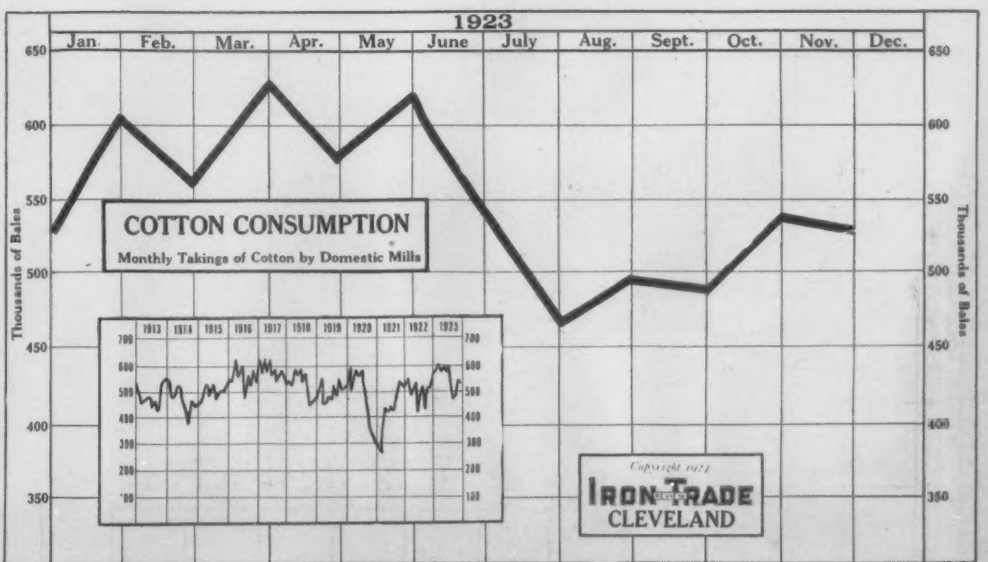
Cost of Building

ALL forms of building costs are down except labor. Wages have steadily advanced to a point 7 per cent above 1920 and 109 per cent above 1913. Building material costs have fallen 40 per cent since 1920 and 12 per cent since the spring of 1923. They have steadied recently. The total cost of building is now 93 per cent above the prewar level. It is 4 per cent below the 1923 top and 24 per cent under the 1920 peak.

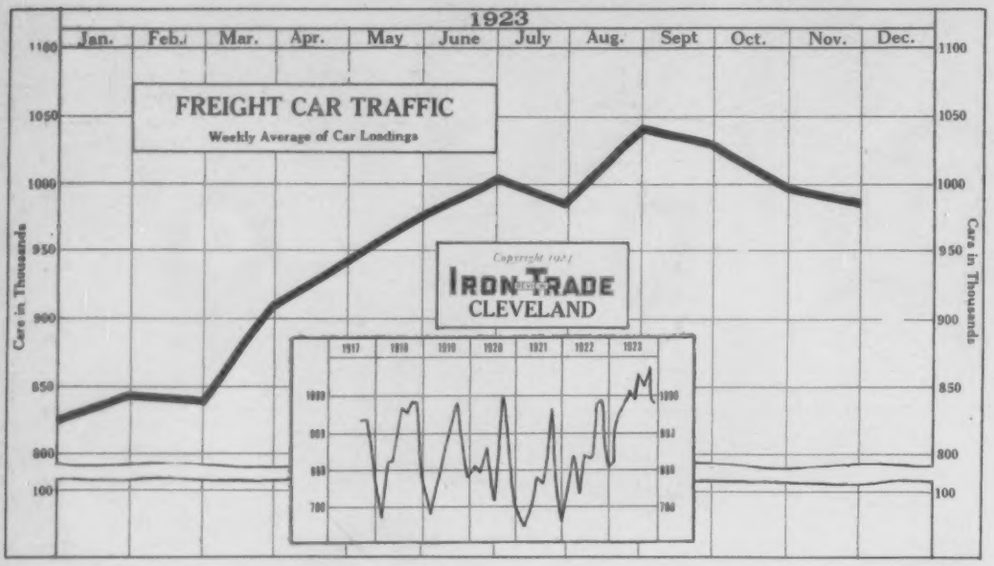


Cotton Takings

CONSUMPTION of cotton by American mills was the largest in 1923 since the war year of 1917. In recent months high prices has curtailed domestic consumption and exports. The 50 per cent rise in prices from the year's low point was due to estimates of another short cotton crop of around 10,000,000 bales, making the third successive crop failure. It seems probable that the supply will not exceed the world's needs.



The Business Trend for 1923

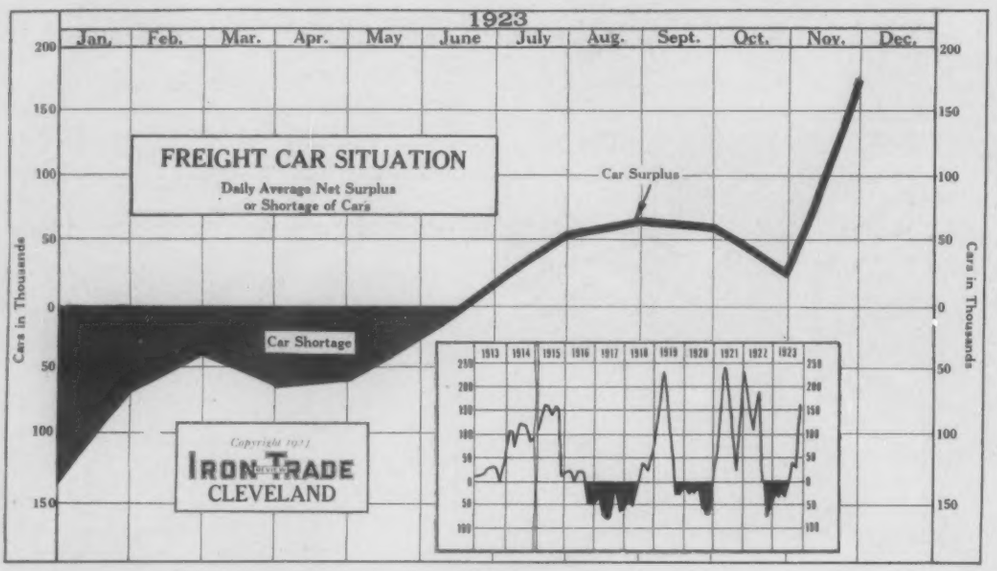


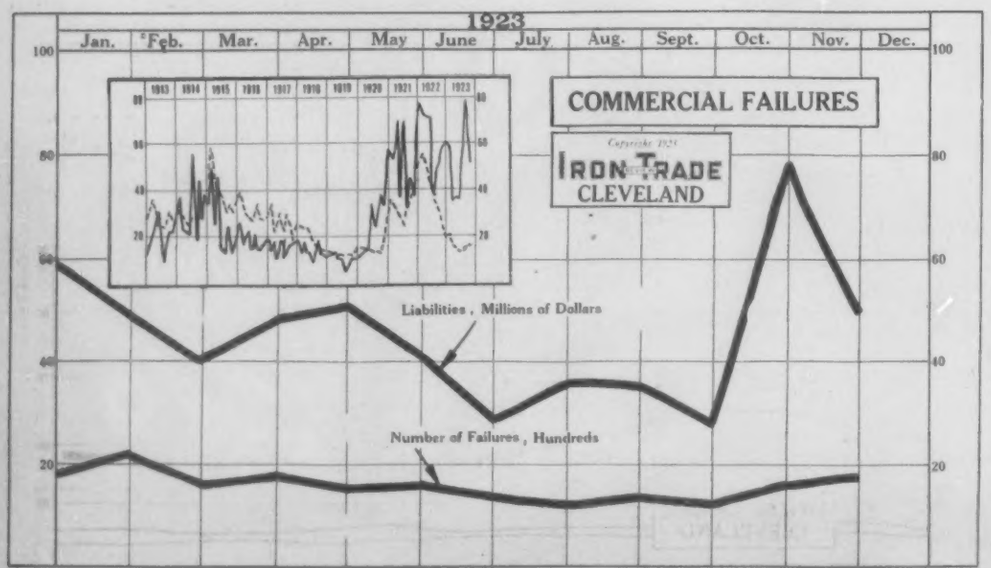
Freight Traffic

THE year's record of car loadings approximated 50,000,000 cars. This exceeded the total for 1922 by 14 per cent and that of the previous record year of 1920 by 10 per cent. In 1923 the roads achieved the highest degree of efficiency in 15 years. Average ton loadings per car were high and average daily car movements were the greatest ever recorded. The year's traffic reflected great industrial activity.

Car Situation

THE curve of this chart shows how the obstacle of freight congestion was removed by the railroads. The net car shortage reached the highest figure in history in October, 1922. From that point it declined until June, 1923 when it turned into a surplus. Contrary to general expectations the surplus was maintained even through the period of the autumn traffic peak. Since October the surplus has gained to 200,000 cars.





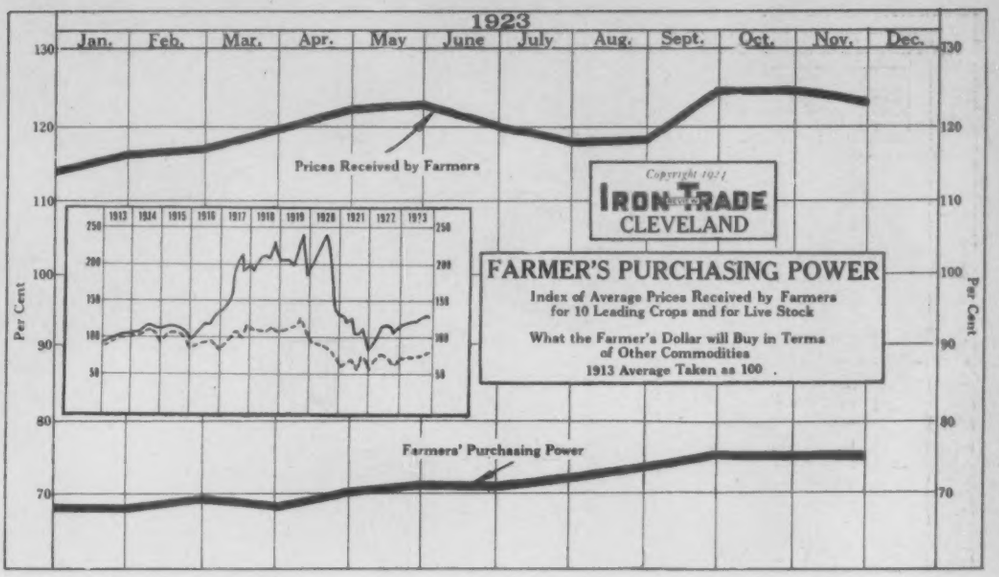
Business Failures

BUSINESS mortality has maintained a relatively high level since 1920 boom. Many new companies formed then are finding it difficult to meet keen competition. From January, 1922 defaults as compiled by the R. G. Dun Co. declined irregularly until October, 1923. The summer lull resulted in a wide spurt in failures in October and November. The record shows improvement over 1922. Eleven months failures were below 1922.

The Business Trend for 1923

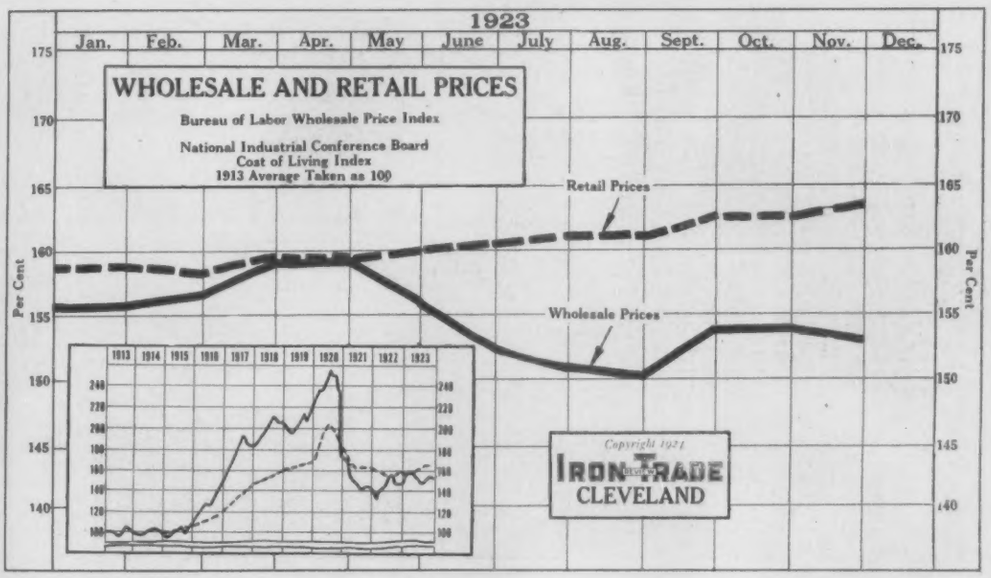
Farmer Position

THE farmer's economic position is the best in four years. Farm prices for all crops and livestock have gained 10 per cent since 1922. The purchasing power of farm products at 75 per cent of 1913 shows a gain of 23 per cent over 1922. The total value of all crops of $8,322,695,000 exceeds 1922 by 11 per cent. Corn leads in value, while cotton is second. The 1923 wheat value dropped 17 per cent below 1922.


1923
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
Prices Received by Farmers
Copyright 1924
IRON TRADE
CLEVELAND
FARMER'S PURCHASING POWER
Index of Average Prices Received by Farmers for 10 Leading Crops and for Live Stock
What the Farmer's Dollar will Buy in Terms of Other Commodities
1913 Average Taken as 100
Farmers' Purchasing Power
Per Cent

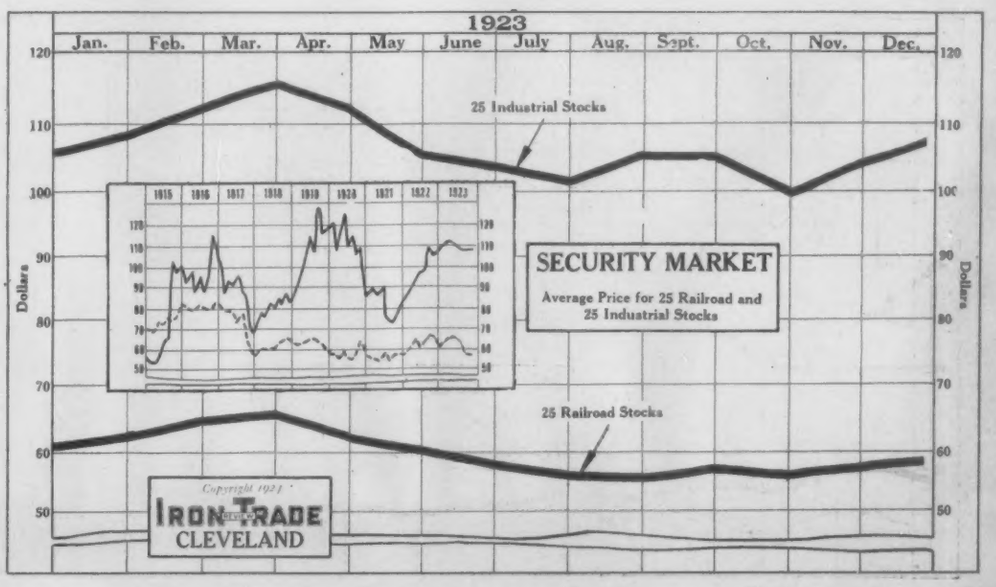
Prices

FLUCTUATIONS of wholesale commodity prices have been less violent during the past 12 months than in any similar period since 1913. The bureau of labor statistics wholesale price index reached its top last spring and nosed gently downward until September, when it stiffened. In December it was 4 per cent under last spring and 52 per cent above 1913. Living costs steadily advanced a total of 5 per cent in 1923.

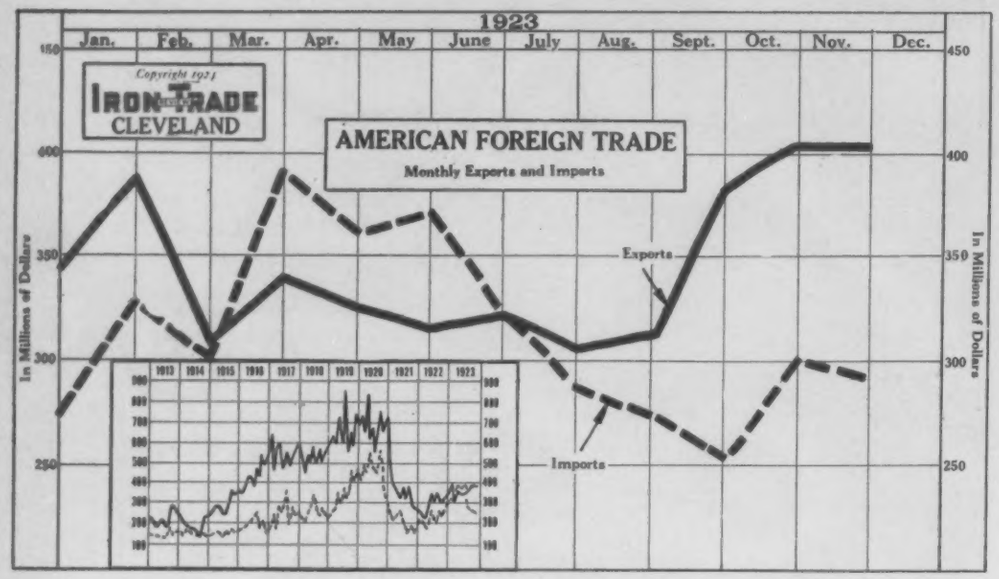


Security Market

FROM the top of the 1923 movement last spring the average for 25 industrial shares, compiled by the New York Times, declined 15 per cent. Twenty-five railroad stocks dropped 18 per cent. Late in October a recovery began which in December had regained 60 per cent of the loss for industrial shares and 34 per cent for railroads. Share averages now stand a shade under their level of one year ago.



The Business Trend for 1923

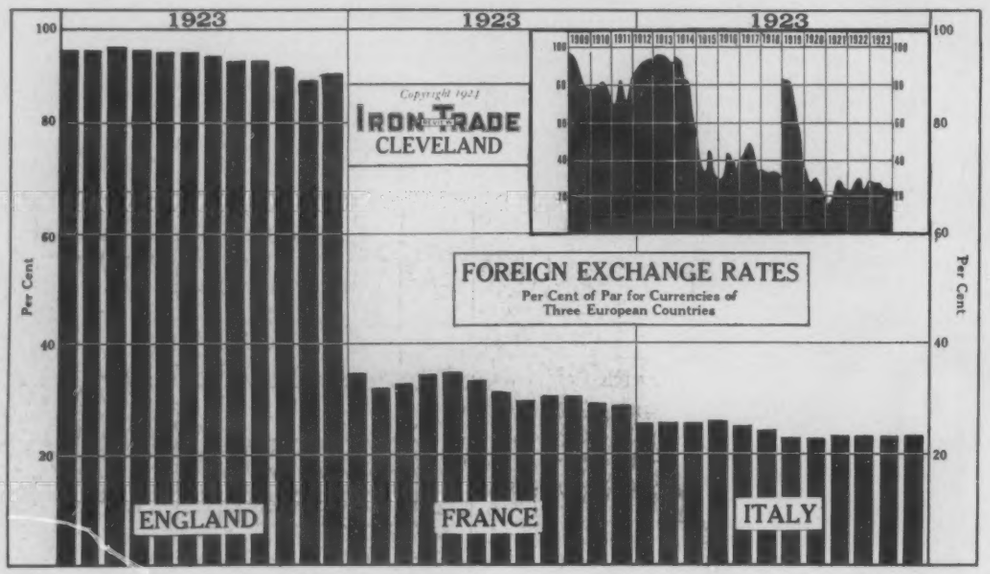


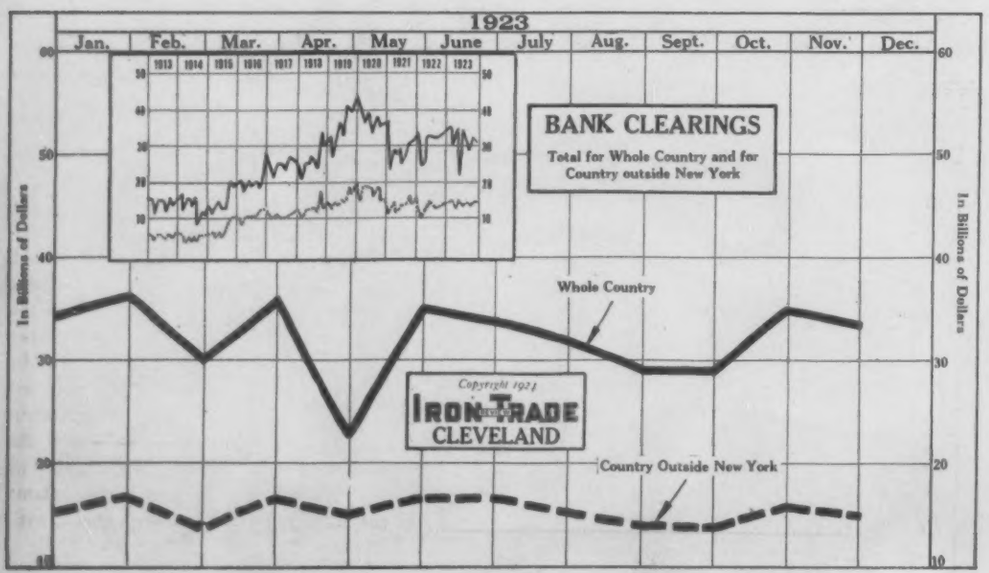
Foreign Trade

AMERICAN exports in 11 months of 1923 totaled $3,745,186,000 a gain of 7 per cent over 11 months of 1922. Imports gained 24 per cent. excess of exports over imports fell 62 per cent from 1922. Imports increased from all countries and exports gained to all countries save the European unit. Exports to Europe declined 7 per cent in 1923, while imports from Europe rose 24 per cent over 1922.

Foreign Exchange

RATES on European currencies were weak in 1923. The Ruhr occupation, and general economic and political unsettlement prevailed. The pound sterling at 90 per cent of par has fallen 6 per cent in 12 months. Francs at 28 per cent of par have declined 20 per cent; while Italian lira at 23.5 per cent of par have fallen 6 per cent. The gas of inflation has annihilated the value of the German mark.




1923
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
BANK CLEARINGS
Total for Whole Country and for Country outside New York
Whole Country
Country Outside New York
Copyright 1924
IRON TRADE
CLEVELAND
In Billions of Dollars
In Billions of Dollars

Bank Clearings

BUSINESS activity in 1923 as measured by bank clearings for the country outside of New York gained 18 per cent over 1922. Clearings in New York City, reflecting security and financial transactions declined 4 per cent. Total clearings, compiled by the Commercial and Financial Chronicle, increased 7 per cent. In 11 months of 1923 there were gains over identical months of 1922 in all but three. Trade gains for 1923 are indicated.

TWELVE-HOUR SHIFT ABOLISHED! STEELWORKS PROBLEM BRIDGED

These workers and many thousands more like them in the iron and steel industry have reason to rejoice. With the long shift gone the average of wages now among 242,171 in 186 establishments is 25 per cent higher than the general average for all of 1922. The present average is only 15 per cent less than the high peak of 1920, while living costs are 20 per cent below

Wages Back at Wartime Peak

Increases in Hourly Rates and Employment Features Year's Operations in Iron and Steel and Related Manufacturing Industries—12-Hour Shift Abolished—"Real" Earnings at Highest Point

SUBSTANTIAL increases in employment and wages, coincident with a reduction in living costs, and the abolishment of the 12-hour shift were the outstanding features of labor developments in the iron and steel industry in 1922. "Real" wages, the measurement of wages in comparison with necessary expenditures for living, are the highest on record. The working man is better situated today than he ever was before, in respect to his income, his reasonable assurance of steady employment, the added attractions of his work and the opportunities that are presented to him. This applies generally to a majority of the basic industries of the country, but nowhere is it more emphatic than in the manufacture of iron and steel. The improvement that began more than a year ago, following widespread unemployment, has been steady and consistent, and the outlook from the standpoint of the average workingman was never brighter.

Government statistics pertaining to employment in the iron and steel industry do not indicate a recent decrease in numbers, though it is well known that here have been some reductions toward the end of the year, of a temporary character in some of the manufacturing lines related to iron and steel. In October 186 establishments reporting to the government gave the total number of their employes as 242,171. The average was 1302. The average in January, 1923 was 1181; this was increased in 1379 in May, and the number fell to 1302 in June, the same figure as recorded for October. The average for the year 1922 was 1253, and for October, 1922, 1260. The average increase per plant between October, 1922, and the same month in 1923, was 42.

The improvement in employment was well under way in the latter months of 1922. As compared with employment in the first few months of 1922, the October, 1923, average showed an increase of about 200 per plant. In 1920 when employment was at the peak, the average number at work in the iron and steel industry as indicated by reports to the government was 1641. The average in October, 1923 was 339 below that figure.

As compared with the peak, the decrease in the average number employed, per plant, was 20 per cent. A similar comparison of the wages received by the employes shows a drop of only 15 per cent. A table, giving the figures by months and years, accompanying this article affords means for making such comparisons. The figures obtained by the bureau of labor statistics, department of labor, from many representative plants in the iron and steel industry check with

Wage Rates in General Manufacturing

Nov. 1, 1923	All round machinists hiring rate per hour cents	Common labor hiring rate per hour cents
Milwaukee	60 to 67½	40 to 45
Racine	55 to 65	37½ to 40
Moline	60 to 70	30 to 40
Chicago	70 to 80	43 to 50
St. Louis	57 to 75	35 to 45
Memphis	77 to 85	27½
Muskegon	55	40
Grand Rapids	50 to 60	35
Lansing	68 to 90	40 to 45
Battle Creek	60 to 70	37½ to 40
Jackson	64	44 to 46½
Saginaw	60 to 70	35 to 45
Flint	70 to 80	40
South Bend	60 to 70	45 to 55
Indianapolis	50 to 75	30 to 40
Louisville	68 to 72	35
Nashville	75	35
Toledo	60 to 90	37½ to 50
Detroit	70 to 80	45 to 50
Cleveland	60 to 70	43 to 45
Akron	75 to 85	35 to 45
Columbus	55 to 65	40
Dayton	60 to 75	35 to 40
Cincinnati	60 to 75	38 to 42
Youngstown	75 to 85	44
Erie	55 to 75	40 to 45
Pittsburgh	60 to 70	40 to 45
Toronto	60 to 65	35 to 40
Buffalo	65 to 70	40 to 45
Rochester	65 to 75	50
Philadelphia	60	40
Wilmington	62 to 70	30 to 45
Newark	65	40 to 45
Albany	60 to 70	40 to 50
New York	65 to 75	45 to 50
Bridgeport	60 to 65	40 to 45
Hartford	55	41
Springfield	55 to 65	40 to 50
Worcester	60 to 70	45 to 55
Boston	65 to 80	35 to 50

Average Monthly Wages in Iron and Steel Industry, and Number of Employes

	Number of establishments	Number of employes	Payroll for half month	Average wage per month	Average wage year previous
October 1923... ...	186	242,171	$15,498,307	$127.99	$115.40
September	178	216,842	13,726,203	126.58	109.56
August	180	235,561	15,369,508	130.49	100.62
July	176	225,470	13,080,477	116.02	83.26
June	166	216,264	14,057,037	129.98	94.58
May	175	241,351	16,080,907	133.08	93.52
April	182	218,591	13,062,933	119.52	88.14
March	189	241,068	14,885,085	123.52	89.02
February	187	223,615	13,668,599	122.24	85.58
January	184	217,303	13,032,701	119.42	78.70
Averages:					
1922	118	147,882	7,378,535	98.78	.....
1921	114	117,223	5,869,438	100.12	.....
1920	105	172,318	13,015,883	151.06	.....
1919	105	154,244	9,989,098	128.22	.....
1918	97	180,859	10,734,114	118.74	.....
1917	97	180,088	8,327,492	92.49	.....

other statistical data from many sources.

In October the average monthly wage among 242,171 workers was $127.99 as compared with $115 in the month, 1922, an increase of 20 per cent. The average thus far in 1923 shows an increase of 25 per cent over that of 1922. It is interesting to note that IRON TRADE REVIEW's composite price of 14 principal iron and steel products on Dec. 12 was $43.05, as compared with $40.53, the average for December, 1922. This represents an increase of only 6 per cent. Unquestionably high wages, at the base of costs, have had an important influence in prices, but not to the extent the sharp upturn in payroll expenditures ordinarily would indicate.

A composite of wages of common labor in the steel industry, specialized mill labor, iron mine labor, molders' and machinists' wages, today is 98 per cent above 1914, as compared with 65 per cent above that base a year ago, and 131 per cent above in 1920.

One of the most convincing observations bearing on the general satisfactory state of employment and wages is that the number of industrial disputes is the lowest in many years. In 1922 the total was 1039, which was less than in any other period in 23 years. The record for 1923, though not yet available, will show as good, if not better record, than in 1922.

The abandonment of the 12-hour shift in the iron and steel industry, with an increase in hourly wage rates, at a time when operations averaged more than 75 per cent and when immigration was greatly restricted, was a remarkable achievement, and one of the most important developments of the year affecting American labor. The leading executives of the industry were long in favor of such a step; their inclinations resulted in combined action at the solicitation of the late President Harding. The Federated American Engineering Societies as a result of their investigation declared that the 12-hour shift was in effect in more than 40 continuous process industries in the United States. They estimated that between 500,000 and 1,000,000 wage earners normally were on shift work, and that one-third to one-half of all workers in continuous operations averaged 12 hours. They gave the number of wage earners in the steel industry on the 12-hour shift as 150,000.

While the abolishment of the long shift affected a large number of workers in the steel industry, the step was not equivalent to a general inauguration of an 8-hour day, a considerable number still working 10 hours. The directors of the American Iron and Steel institute, however, stated that employes connected with continuous processes would be reduced from 12 to 8 hours, and the steel industry has been removed from the long list of those in which the 12-hour shift prevails.

The wage earners placed on an 8-hour basis in August were given an advance of 25 per cent on their previous hourly rate. That brought their hourly rate to 50 cents, or 150 per cent above the hourly average in 1915. This is far above the average industrial increase.

The peak in the United States Steel Corp's common labor wage schedule was reached in February, 1920, when it was $5.06 for 10 hours. The basic 8-hour day was in effect and they received time and one-half for overtime.

Wage Changes Based On Selling Prices

Amalgamated Association of Iron, Steel and Tin Workers' Scale

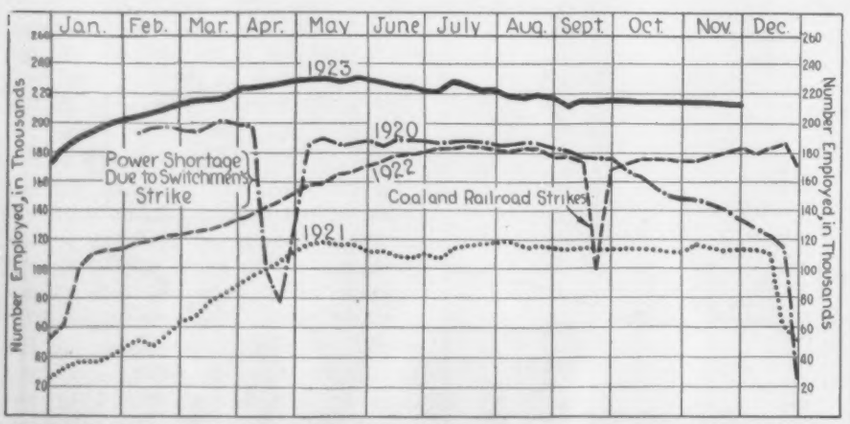
	Percentage advance at peak over 1914	Percentage advance in Nov.-Dec., 1922 over 1914	Percentage advance in Nov.-Dec., 1923 over 1914
Sheet mill workers	109.5	37.5	48
Tin mill workers..	96.5	23.0	48
Bar mill workers			
Puddling	235.0	80.0	139
Cinder bottom:			
Heavy scrap....	271.0	84.5	135
Light scrap	253.0	80.0	125
Cast swarth....	250.0	80.0	124
Sand bottom:			
Heavy scrap....	212.0	64.0	101
Light scrap	271.0	87.0	135
Muck rolling....	227.0	72.0	111
Piling on boards.	138.0	43.0	66
Heating	174.0	50.0	81
Guide mill	137.0	44.5	67
Average, bar mill.	216.8	68.5	108

Their hourly earnings in 10 hours time averaged 50.6. Today the hourly rate for those on 8-hour shifts is practically at the peak. If the decrease in the cost of living is considered, the "real" hourly earnings far surpass those of any previous period.

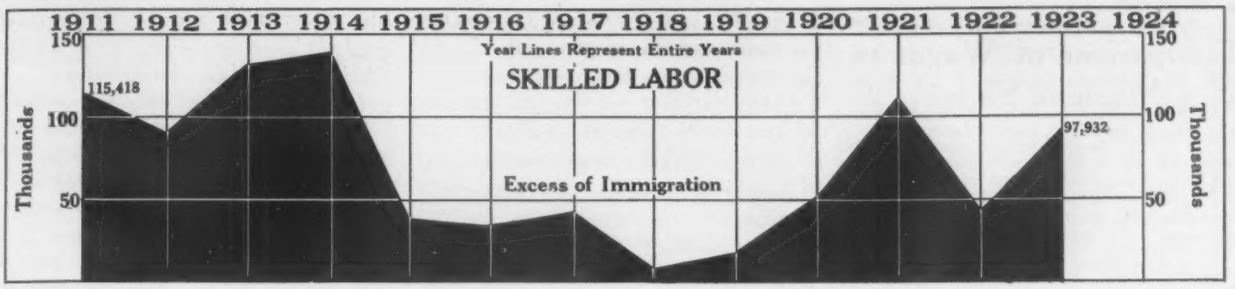
The workers on a 10-hour basis, under the new arrangement, received an advance of 10 per cent, bringing their hourly rate to 44 cents, or 120 per cent over the rate in 1915. Their pay for 10 hours is $4.44, as compared with $4 for eight hours paid to the latter class of workers.

In readjusting wages to meet the new conditions, the steel manufacturers "split the difference." The 12-hour men placed on 8 hours were paid the same as if they had worked 10 hours under the former rate, while those placed on 10 hours, received the same as they would have been paid formerly for 11 hours. While the margin between the 8-hour and 10-hour men is 44 cents, or 22 cents an hour.

"Splitting the difference" was the log-



THIS CHART PREPARED BY THE EMPLOYERS' ASSOCIATION OF DETROIT GIVES THE NUMBERS OF PERSONS EMPLOYED BY FIRMS WHOSE EMPLOYING STRENGTH REPRESENTS TWO-THIRDS OF THE TOTAL IN THAT CITY AND SUBURBS



THE NET GAIN IN SKILLED WORKERS, AS CLASSIFIED IN GOVERNMENT IMMIGRATION RETURNS, WAS 97,932 FOR THE FISCAL YEAR ENDED JUNE 30.

ical solution of what otherwise might have become a serious problem. The change was accomplished without friction. An increase in hourly pay to make up for some of the wage earners' loss due to a reduction in the number of hours worked, destroyed the hope of trade unions for organizing another strike. Organizers continued to invade the steel districts, as a well-known national daily observed, but they came "to form soccer teams, not unions." The men now have more leisure.

An accompanying table sets forth the minimum and maximum hourly wages for common labor in general manufacturing in 40 representative cities of the United States, as of Nov. 1. The average of the lowest is 40 cents, an advance of 9 per cent over the average of 37 cents a year ago. The average of the maximum is 44 cents, an advance of 14 per cent. This average maximum is the same as the hourly rate of 10-hour workers in the iron and steel industry. The 8-hour steel workers, with their 50 cents, receive 6 cents above the average of the maximum figures in general manufacturing. In only 10 of the 40 cities listed are the best classes of common laborers paid as high as 50 cents an hour.

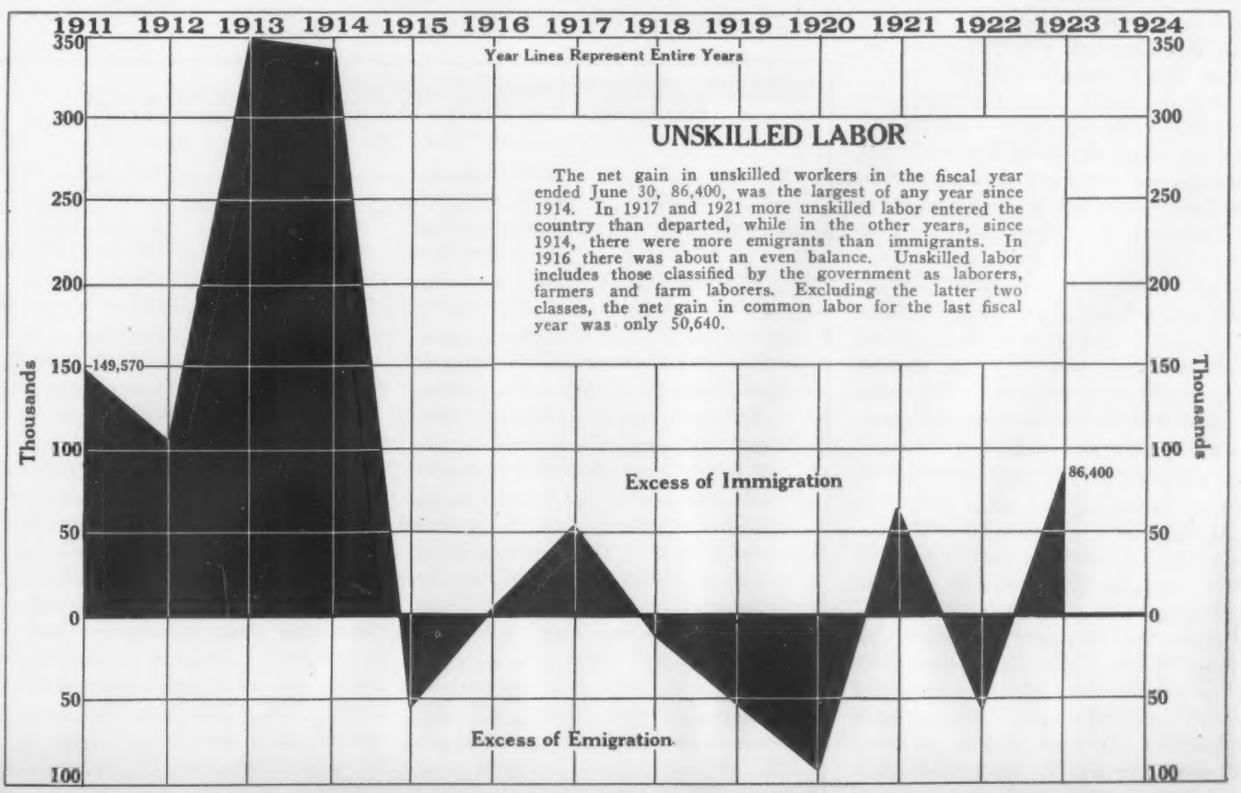
In the same table is a comparison of wages paid all-around machinists in general manufacturing in 40 cities. The average of the lowest is 62 cents an hour, representing an advance of 7 per cent in the year, and the average of the highest is 72 cents, an advance of 17 per cent.

Wages paid to all classes of workers in machine shops represented in the National Metal Trades association advanced, on an average, about 15 per cent. In some departments, the increase amounted to less than 10 per cent, while in others it was as high as 20. Another table showing wages, at stated intervals, for various workers in machine shops in the Cleveland district, indicates the general trend. The composite is 85 per cent above that for 1914, as compared with 125 per cent above that base, when the wages were at the peak.

Employment in machine shops is greater today than a year ago, but recently some recession has been noticed, though wages have not been affected. The number of assemblers employed afford some indication of the status of general operations, and this class of workers have become more plentiful since September, so that it be possible to obtain them at less than 50 cents an hour, though this rate still prevails in the Cleveland district.

Machine shops were exceptionally free from labor disturbances during the year; a few occurred in Massachusetts and several in the Chicago district, none of importance. In some cities attempts to organize and call strikes failed.

In the foundries, also, fewer strikes occurred during the past year than in any year since the war. The status of


1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924
Year Lines Represent Entire Years
UNSKILLED LABOR
The net gain in unskilled workers in the fiscal year ended June 30, 86,400, was the largest of any year since 1914. In 1917 and 1921 more unskilled labor entered the country than departed, while in the other years, since 1914, there were more emigrants than immigrants. In 1916 there was about an even balance. Unskilled labor includes those classified by the government as laborers, farmers and farm laborers. Excluding the latter two classes, the net gain in common labor for the last fiscal year was only 50,640.
149,570
86,400
Excess of Immigration
Excess of Emigration
Thousands
350
300
250
200
150
100
50
0
50
100

Comparison of Wages in Machine Shops

	Average hourly rate, Feb., 1915	Average hourly rate at peak, 1920	Average hourly rate, Jan. 1, 1923	Present average hiring rate
Toolmakers	$0.40	$0.79	$0.65	$0.72
Machinists	0.35	0.72	0.57½	0.60
Lathe hands, under 24-inch	0.32½	0.65	0.51½	0.54
Lathe hands, over 24-inch	0.37½	0.61	0.56½	0.60
Planer hands, under 36-inch	0.30	0.72	0.52	0.57½
Planer hands, larger	0.35	0.70½	0.57	0.65
Grinders, rough	0.25	0.50	0.36	0.43
Scrapers	0.30	0.69	0.55	0.55
Floor hands	0.35	0.65	0.51	0.58
Bench hands	0.30	0.62	0.40	0.47½
Drill press, ordinary	0.25	0.54	0.40	0.48
Drill press, radial	0.30	0.59	0.45	0.53
Boring mill	0.37½	0.72	0.56	0.60
Screw machine, hand	0.25	0.55½	0.46	0.50
Screw machine, automatic	0.30	0.65	0.50	0.60
Turret lathe	0.32½	0.65	0.50	0.50
Milling machine, hand	0.25	0.56	0.43	0.46
Milling, plain	0.27½	0.63	0.50	0.53
Milling, universal	0.30	0.58	0.58	0.60
Blacksmiths, forge men	0.30	0.70	0.60	0.64
Blacksmiths, hammermen	0.30	0.71	0.60	0.64
Patternmakers, wood	0.35	0.92	0.75	0.80
Helpers	0.25	0.54	0.40	0.46
Polishers	0.30	0.60	0.54	0.60
General labor	0.20	0.45	0.38	0.44

The foregoing averages while taken from the statistics in the Cleveland district are fairly representative of the averages in the largest districts of the country represented in the National Metal Trades association. The comparison is given to indicate the changes in wages applied to the more important classifications. In the majority of all reports, the minimum or maximum rates paid do not vary over 10 per cent from the above averages in Cleveland.

unions and employers did not change much. In the last few months employment has fallen off, especially in large centers like Cleveland and Pittsburgh; the letdown being noted since September. Shops on automobile parts and brass foundries especially have felt the relaxation in new work, but when men have been paid off it has been with the understanding of a resumption early in 1924.

Wages in foundries have been good; in all of 11 centers for which records are compiled advances have been recorded during the year, so that the average of the hourly rates now is 125.8 per cent over 1914, as compared with 93.5 per cent a year ago, and 135.7 per cent when the wages were at the peak.

In an accompanying table, it will be noted that the wages Dec. 1 in Boston, Cincinnati, Pittsburgh, and Cleveland are the same as at the former peaks in those cities. In New York City they are above the previous high mark. In Chicago molders now are receiving $8 for an 8-hour day. At the war peak the rate was $8.40, or only 5 cents more an hour. The general average of molders' wages in the 11 centers is $7.20, which is an advance of $1.05 per day of 8 hours over $6.15 a year. This represents an increase of 17 per cent. Wages and percentages of gains, at four periods, for the respective centers are given in the table. Wages based on selling prices of products, by agreement between independent mills and the Amalgamated Association of Iron, Steel and Tin Workers, advanced during the year, and in some instances the base rates were increased. The average for the mills of the Western Bar Iron association for the November-December period was 108 per cent above 1914, as compared with 68.5 per cent a year ago, and 216.8 per cent at the peak. The base rate for puddling was advanced $1 by agreement for the year ending June 30, 1924, this being the principal change in the rates pertaining to bar mills. The effect of this was the same as though there had been a greater advance in selling prices. Under the 1923-1,24 scale, bar iron selling at 2.40c per pound resulted in a payment of $13.38 per ton to the puddler, while under the previous scale the payment would have been $12.38. The difference is the same as though $4 per ton had been added to the selling price of bar iron. The average selling price advanced from 1.95c to 2.40c, or $9 per ton, from $39 to $48 from the September-October period of 1922 to the same months in 1923. November and December wages are based on the selling price average for the preceding two months.

The average of the puddlers' wages in 1914 was $5.60 per ton, and the peak was reached in January-February, 1921, at $18.76. From that point there was a gradual letdown to $7.63 in May-June, 1922. The trend then was upward until September-October, 1923, when the rate reached $13.88. In November-December it declined to $13.38, this being the first reduction in a year and one half.

A change was made in the 1923-1924 agreement with the Amalgamated association, whereby tin mill workers in the independent mills were placed on the same base for computation of wages as those of the sheet mills. That is, when average invoiced selling price of 26, 27, 28-gage plain sheets is $2.15 per 100 pounds, the tonnage rates shall be as specified in a schedule, with 1½ per cent increase for each member of the crew, for each 5 cents per 100 pounds advance over $2.15. This is the same as the sheet mill scale.

Previously the tin mill scale provided that when the average price of a box of 100 pounds of coke tin plate prime sheets was $3.50, the advance for the crew was to be 1 per cent for each 5 cents rise in the price per box. The schedule to which this applied, fixing in detail the actual amounts paid for the various classifications of workers, remains the same under the new agreement as before. A novel feature of the arrangement provided for a trial until Jan. 1, when if the tin mill workers had

Advance in Union Molders' Wage Rates

Rates prior to war, 1914	Postwar Peak	Rates One Year Ago	Rates Dec. 1, 1923
BOSTON: $3.50 for 9 hours	$7.20 for 8 hours 131.9% over prewar	$6.00 for 8 hours 93.2% over prewar	$7.20 for 8 hours 131.9% over prewar
CHICAGO: $4.00 for 9 hours	$8.40 for 8 hours 136.4% over prewar	$6.50 for 8 hours 82.8% over prewar	$8.00 for 8 hours 125.2% over prewar
CINCINNATI: $3.50 for 9 hours	$7.00 for 8 hours 125.5% over prewar	$5.50 for 8 hours 77.0% over prewar	$7.00 for 8 hours 125.5% over prewar
DETROIT: $3.50 for 9 hours	$8.50 for 8 hours 173.7% over prewar	$6.00 for 8 hours 93.2% over prewar	$6.00 for 8 hours 93.2% over prewar
MINNEAPOLIS: $3.50 for 9 hours	$7.20 for 8 hours 131.9% over prewar	$6.00 for 8 hours 93.2% over prewar	$6.16 for 8 hours 98.4% over prewar
NEW ORLEANS: $3.25 for 9 hours	$7.20 for 8 hours 149.3% over prewar	$6.00 for 8 hours 105% over prewar	$6.00 for 8 hours 109.7% over prewar
NEW YORK CITY: $3.75 for 9 hours	$7.04 for 8 hours 111.5% over prewar	$6.75 for 8 hours 101.9% over prewar	$8.00 for 8 hours 140.3% over prewar
PITTSBURGH: $4.00 for 9 hours	$7.50 for 8 hours 111% over prewar	$6.44 for 8 hours 81.3% over prewar	$7.50 for 8 hours 111% over prewar
ST. LOUIS: $3.50 for 9 hours	$8.00 for 8 hours 157.7% over prewar	$6.50 for 8 hours 109.2% over prewar	$7.50 for 8 hours 141.3% over prewar
CLEVELAND: $3.50 for 9 hours	$7.20 for 8 hours 131.9% over prewar	$6.00 for 8 hours 93.2% over prewar	$7.20 for 8 hours 131.9% over prewar
INDIANAPOLIS: $3.50 for 9 hours	$7.20 for 8 hours 131.9% over prewar	$6.00 for 8 hours 93.2% over prewar	$7.00 for 8 hours 125.5% over prewar

not suffered any loss it was to be continued. They have gained by it. If they were on the same basis as before their wages now would be 39 per cent above base, whereas they are 48 per cent, the same as that of the sheet mill workers.

Not more than 16 per cent of the workers added to the population of the United States through the channels of immigration in the last fiscal year can be considered directly or remotely concerned with the manufacture of iron and steel or its products. The proportion probably is considerably less. The total number of aliens admitted, except those of the professions, was 506,377. In the same period 78,913 aliens departed. The excess of immigrants was 427,464.

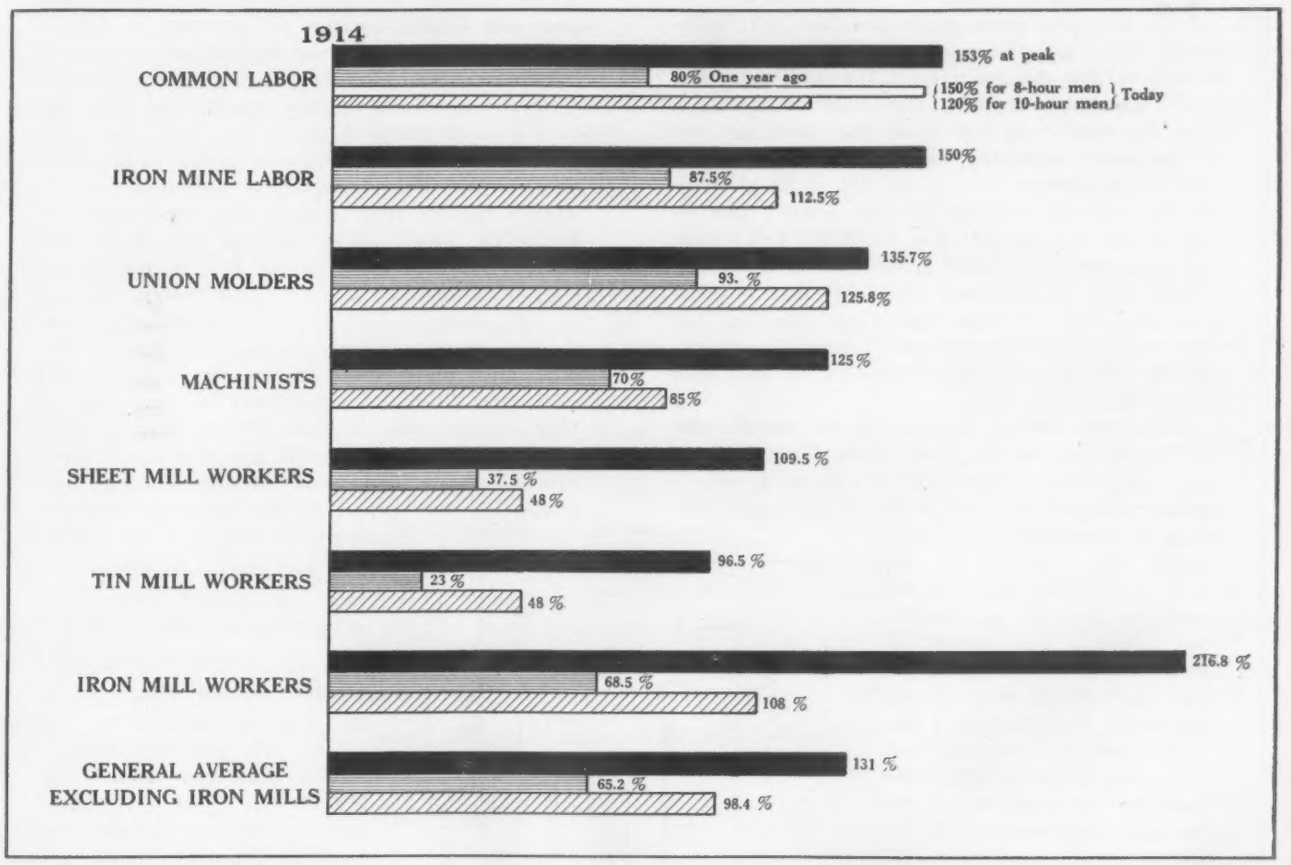
Under the various classifications in the government returns, there were 83,552 unskilled laborers; 4076 iron and steel workers; 4418 machinists, 5423 miners; 2817 locomotive, marine and stationary engineers; 4644 mechanics; 729 stokers and 343 patternmakers. The total number of such immigrants was 106,002. The number of emigrants of the same classifications was 34,645, leaving a net gain of 71,357. Even if all of these were absorbed in the iron and steel and related industries, which was by no means the case, the comparison indicates that about 6 immigrants were admitted for each new worker in the country's principal basic industry.

It has been assumed for years that the iron and steel industry was the chief beneficiary of an unrestricted inflow of labor, and therefore the objectionable features of such a system were charged to insatiable demands of the industry for alien labor. Gradually the truth has become recognized that for every real worker and prospective citizen of desirable characteristics, this country has admitted many more nondescripts or radicals. The need for more desirables, and fewer of the dangerous element has led to the proposal for selective immigration. Regardless of the number of aliens to be admitted in a year and how the quotas are to be divided, this now seems to have become a basic feature of the future immigration policy, that those admitted to the United States must first of all be worthy of citizenship.

A net gain of 86,400 unskilled workers was registered in the record of immigration and emigration for the last fiscal year. By unskilled workers is meant laborers, farmers and farm laborers. During the year 83,552 laborers arrived and 32,912 departed, the net gain in this classification being only 50,640, or about 10 per cent of the total number of immigrants. The total number of unskilled workers who came to this country was 121,960, and the number of those who departed, 35,560. The net gain of 86,400 is larger than in any of those years in which there was excess of immigration over emigration, since 1915. However, it is only one-fourth of the net gain in 1913, and in 1914.

The net gain in skilled labor was 97,932 during the last fiscal year, as compared with 33,630 in the preceding year. "Skilled labor" includes all so classed in the federal immigration returns. The largest number of any one race to come to the United States was 65,543 Germans; the next largest 62,709, Mexicans, and third 60,524, from England.

One of the conspicuous results of the operation of the 3 per cent limitation act was the migration of nearly 500,000 negroes from the farm regions of the South to northern industrial districts. The government's figure, 478,700 for 12 months, is but 17,677 less than the total number of immigrants admitted during the last fiscal year, and 61,236 more than the net gain in population from alien sources.



WAGE ADVANCES EXPRESSED IN PERCENTAGES OVER 1914, WHEN WAGES WERE AT THE PEAK IN 1920, AS THEY WERE A YEAR AGO AND AS THEY ARE TODAY

World Output Nearly Prewar

Owing to Magnificent Production of United States, World's Steel Production Reached 97 Per Cent of 1913 Level Last Year— European Output Gains Except in Germany

WITH the exception of Germany, practically every country in the world increased its iron and steel production last year compared with 1922. In many cases the output was greater than in the boom year 1920, with the result that 1923 witnessed the manufacture of more pig iron and steel than any other year since the end of the war. According to statistics compiled by IRON TRADE REVIEW through the aid of its globe-encircling editorial organization, the world's production of pig iron in 1923 was 64,580,000 gross tons, compared with 51,938,000 gross tons in 1922, 34,700,000 tons in 1921, and 77,182,000 tons in 1913. The production of steel ingots and castings last year was 72,573,000 gross tons, compared with 63,098,000 tons in 1922, 42,487,000 tons in 1921, and 75,019,000 tons in 1913.

The compilation of statistics of the world's production was initiated by IRON TRADE REVIEW several years ago. The continuation of this work over a considerable period of time now enables some interesting comparisons to be made. Slowly the production of the world is creeping up to prewar levels but has not yet reached that height. The output of steel ingots and castings in the year just closed was 97 per cent of the 1913 figure and that of pig iron was 84 per cent. This record is due largely to the wonderful development of the iron and steel industry of the United States. America in 1923 turned out 9,000,000 tons more pig iron than in the last prewar year, registering a gain of 30 per cent. American steel production was 13,000,000 tons ahead of 1913, the gain in this case being 42 per cent. The United States last year for the purposes of peace and commerce used as much iron and steel as under the maximum stimulus of the war's huge demands. This registers an industrial recovery which no other nation, or group of nations, can approach. Pig iron production in France, Belgium, and Luxemburg in 1923 was practically at the prewar level for the first time since the armistice. France's and Great Britain's steel output exceeded 1913 last year by moderate amounts, the figures being 816,000 tons or 10½ per cent in the case of England and 136,000 tons or 3 per cent in France. But it is the American contribution which is largely responsible for the encouraging world totals.

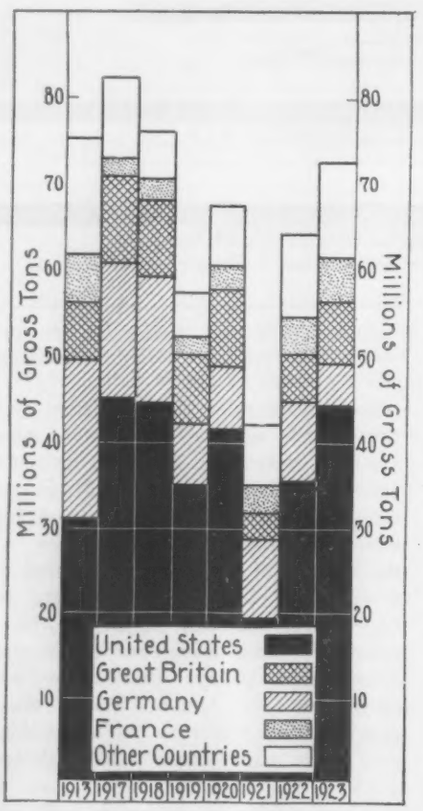


DIAGRAM SHOWING HOW WORLD'S STEEL OUTPUT CAME BACK IN 1923 DUE LARGELY TO AMERICAN ACTIVITY

Nearly two-thirds of the world's pig iron and steel were "made in America" last year. The exact ratio is 61¼ per cent. Owing partly to the troubles in the Ruhr, America's proportion of the world's tonnage now is about the same as it was during the latter part of the war and up to 1920. In that year we made 62 per cent of the world's pig iron. America's share dropped to 47½ per cent in 1921, rising to 51¾ per cent the following year. Turning to steel production we find that in 1918 the United States made 58 per cent of the world's total. In 1919 the figure was 61 per cent; in 1920, 63 per cent; in 1921, 46 per cent; in 1922, 56 per cent, and last year 61 per cent again. These figures indicate that under normal post-war conditions we may expect to find America producing nearly two-thirds of the world's iron and steel. In half a century the United States has changed places with Great Britain. The latter country again occupies second place on the list, with an output of pig iron in the year just closed of 7,360,000 tons and of steel, 8,480,000 tons. But it is significant, in view of developments along the Rhine, that even with the Ruhr industries operating at a very low rate during the past nine months, France and Germany combined turned out 9,000,000 tons, or about a million more than England. With the plants in the Ruhr and Lorraine properly tuned up, the capacity of these two countries approaches 25,000,000 tons a year. It is only along the Rhine that America's supremacy in iron and steel can be challenged. On account of the Ruhr troubles, production in Germany last year fell off about half, but owing to increased activity in other countries, the total output of Europe was maintained at a relatively high level. The production of steel ingots and castings was slightly higher than in

1922, and that of pig iron only slightly less. That Europe is making headway in spite of difficulties is shown by the fact that her pig iron production last year was 22,605,000 tons compared with 18,539,000 tons in 1919, the first year after the war; the figures for steel output being respectively 26,023,000 tons in 1912 and 20,652,000 tons in 1919. In view of the collapse of Germany, this showing is remarkably good. Europe's production of iron and steel last year was around 36 per cent of the world's total. It was, however, only about three-quarters of the 1913 output, leaving Russia out of the account. This is a fair measure of the economic position of the Old World. Business in Europe is three-quarters of what it ought to be.

Although the East is growing in importance as an iron and steel production center, its total output last year was only about a million tons, including Australia. South America and Africa have not yet come into the picture. Europe and the United States still account for 96 per cent of the world's iron and steel output.

Broadly speaking international trade held up very well last year. The combined exports of the United States, Great Britain, Germany, France, and Belgium, the figures for the latter country including Luxemburg, were 12,150,000 tons in 1923 compared with 11,593,900 tons in 1922, and 8,390,700 tons in 1921. The increase over 1921 is 45 per cent, that over the boom year 1920 is 4 per cent. The shipments last year aggregated 78 per cent of the 1913 figures. Imports of iron and steel products by the same countries also show a gain, the total for last year being 4,980,000 tons compared with 4,751,000 tons in 1922 and 3,346,200 tons in 1921. Great Britain continues to be the leading exporter, her outgoing shipments last year being double those from the United States.

Table I

The World's Production of Iron and Steel

Before, During and Since the War—Gross Tons

Pig Iron

	1923	1922	1921	1920	1919	1918	1917	1913
United States	39,500,000	26,851,000	16,506,000	36,401,000	30,579,000	38,437,000	38,165,000	30,653,000
Canada	950,000	404,000	617,000	999,000	863,000	1,107,000	1,086,000	1,015,000
Great Britain	7,360,000	4,902,000	2,616,000	8,035,000	7,398,000	9,086,000	9,322,000	10,260,000
France	5,000,000	5,147,000	3,308,000	3,386,000	2,374,000	1,286,000	1,707,000	5,126,000
Belgium	2,118,000	1,578,000	862,000	1,099,000	247,000	1,000	8,000	2,428,000
Luxemburg	1,350,000	1,650,000	955,000	682,000	608,000	.....	.....	.....
Italy	200,000	91,000	75,000	107,000	251,000	328,000	497,000	420,000
Spain	200,000	175,000	175,000	248,000	290,000	380,000	352,000	418,000
Sweden	350,000	255,000	304,000	477,000	501,000	766,000	843,000	730,000
Germany	4,000,000	8,000,000	6,096,000	5,568,000	6,192,000	11,672,000	12,931,000	19,000,000
Austria	335,000	317,000	211,000	96,000	61,000	.....	2,000,000	2,343,000
Czechia	590,000	339,000	532,000	699,000	617,000	.....	.....	.....
Poland	492,000	458,000	640,000	100,000	.....	.....	.....	.....
Hungary	295,000	246,000	50,000	30,000	.....	.....	.....	.....
Russia	315,000	125,000	115,000	15,000	.....	.....	1,500,000	4,486,000
Japan	300,000	300,000	200,000	168,000	206,000	178,000	121,000	56,000
China	375,000	400,000	600,000	.....	.....	.....	.....	.....
India	450,000	350,000	371,000	312,000	320,000	265,000	252,000	.....
Australia	300,000	250,000	318,000	257,000	236,000	177,000	147,000	47,000
Miscellaneous	100,000	100,000	149,000	181,000	100,000	68,000	100,000	200,000
World total	64,580,000	51,938,000	34,700,000	58,854,000	50,843,000	63,751,000	69,031,000	77,182,000

Steel Ingots and Castings

United States	44,400,000	35,603,000	19,744,000	42,133,000	34,671,000	44,462,000	45,061,000	31,301,000
Canada	1,000,000	485,000	669,000	1,109,000	928,000	1,695,000	1,562,000	1,043,000
Great Britain	8,480,000	5,881,000	3,703,000	9,067,000	7,894,000	9,539,000	9,717,000	7,664,000
France	4,750,000	4,464,000	3,010,000	3,002,000	2,151,000	1,780,000	2,196,000	4,614,000
Belgium	2,185,000	1,539,000	780,000	1,233,000	329,000	10,000	10,000	2,428,000
Luxemburg	1,117,000	1,368,000	747,000	561,000	360,000	.....	.....	.....
Italy	800,000	600,000	672,000	762,000	763,000	976,000	1,311,000	918,000
Spain	300,000	250,000	100,000	150,000	250,000	320,000	480,000	381,000
Sweden	400,000	343,000	203,000	430,000	483,000	536,000	572,000	582,000
Germany	5,000,000	9,000,000	8,700,000	6,624,000	7,648,000	14,738,000	16,322,000	18,631,000
Austria	482,000	473,000	329,000	196,000	.....	.....	2,872,000	2,584,000
Czechia	738,000	630,000	904,000	958,000	774,000	1,003,000	.....	.....
Poland	935,000	930,000	1,476,000	60,000	.....	.....	.....	.....
Hungary	344,000	295,000	90,000	40,000	.....	.....	.....	.....
Russia	492,000	212,000	161,000	45,000	.....	.....	2,000,000	4,760,000
Japan	500,000	500,000	558,000	301,000	295,000	328,000	364,000	13,000
China	150,000	150,000	150,000	.....	.....	.....	.....	.....
India	200,000	175,000	182,000	156,000	187,000	184,000	163,000	.....
Australia	200,000	100,000	209,000	167,000	178,000	142,000	150,000	.....
Miscellaneous	100,000	100,000	100,000	151,000	200,000	300,000	410,000	100,000
World total	72,573,000	63,098,000	42,487,000	67,145,000	57,111,000	76,013,000	83,190,000	75,019,000

Figures for Germany include Luxemburg prior to 1919; figures for Austria prior to 1919 include the major portions of Czechia and Hungary; Poland's production prior to 1919 is covered in the figures for Germany and Russia; since 1920 Poland's figures include most of Upper Silesia.

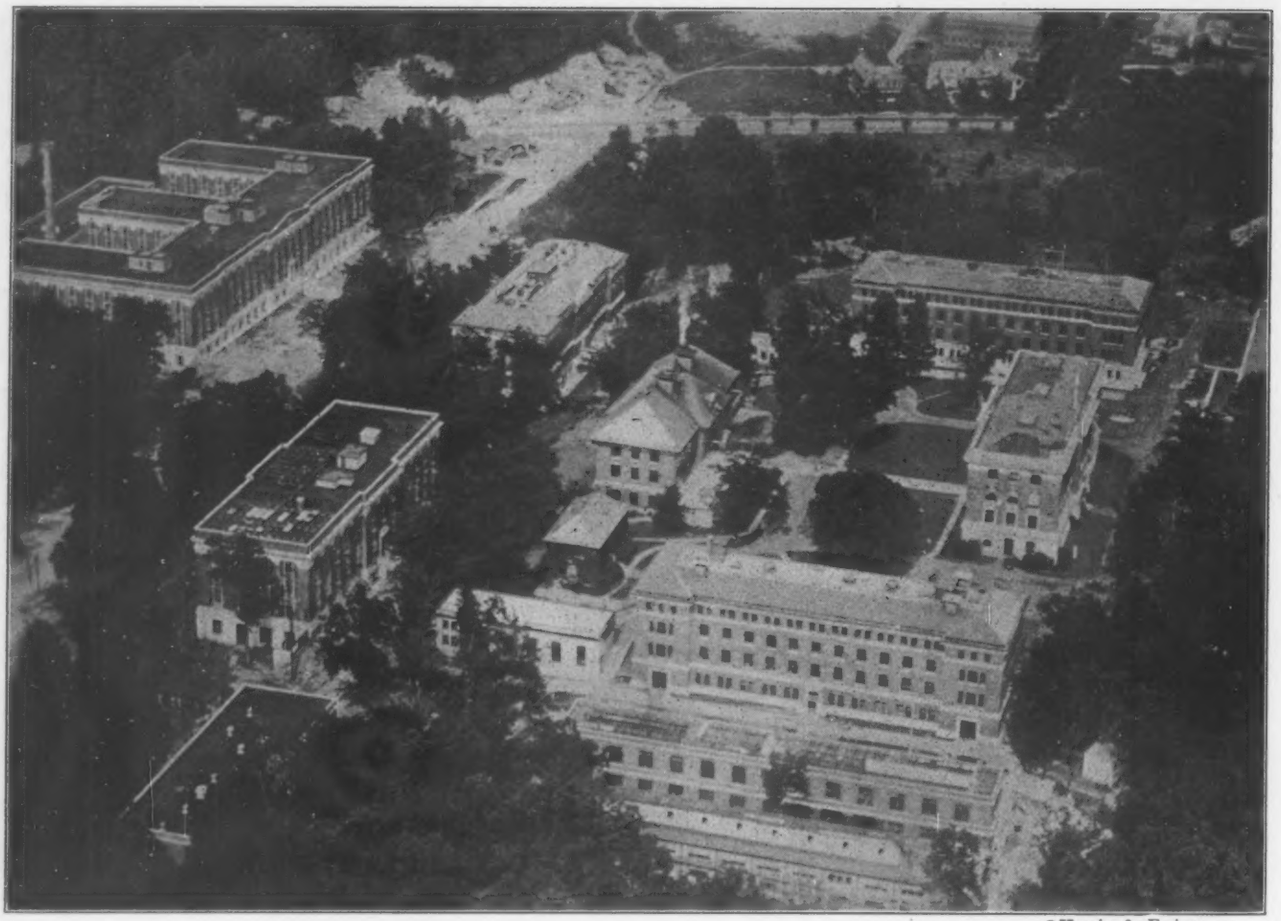
Table II

Exports and Imports of the Principal Countries

Gross Tons—Scrap Eliminated

	Exports					Imports				
Country	1923	1922	1921	1920	1913	1923	1922	1921	1920	1913
United States	2,100,000	1,992,700	2,150,300	4,934,000	2,746,000	740,000	733,300	135,800	421,000	317,000
Great Britain	4,400,000	3,401,100	1,696,900	3,253,000	5,049,000	1,340,000	881,800	1,640,000	1,108,000	2,231,000
Germany	1,250,000	2,516,400	2,110,000	1,751,000	5,664,000	1,800,000	1,861,200	621,400	419,000	284,000
France	2,000,000	1,968,000	1,529,900	895,000	578,000	600,000	771,600	434,800	1,068,000	155,000
Belgium (b)	2,400,000	1,715,700	903,600	891,000	1,546,000	500,000	503,100	514,200	804,000	827,000
Total	12,150,000	11,593,900	8,390,700	11,724,000	15,583,000	4,980,000	4,751,000	3,346,200	3,820,000	3,814,000

(b) Includes Luxemburg from July 1, 1922.



©Harris & Ewing

Group of Buildings of Bureau of Standards Shown by Aerial Photograph

Blocs Block Way at Washington

Constructive National Legislation Hampered by Factional "My Way or None"—Continued Restriction on Immigration Only Positive Assurance—Many Great Problems Awaiting Solution—Trade Commission Issue Near Finality

BY FRED B. PLETCHER
Washington Correspondent, Iron Trade Review

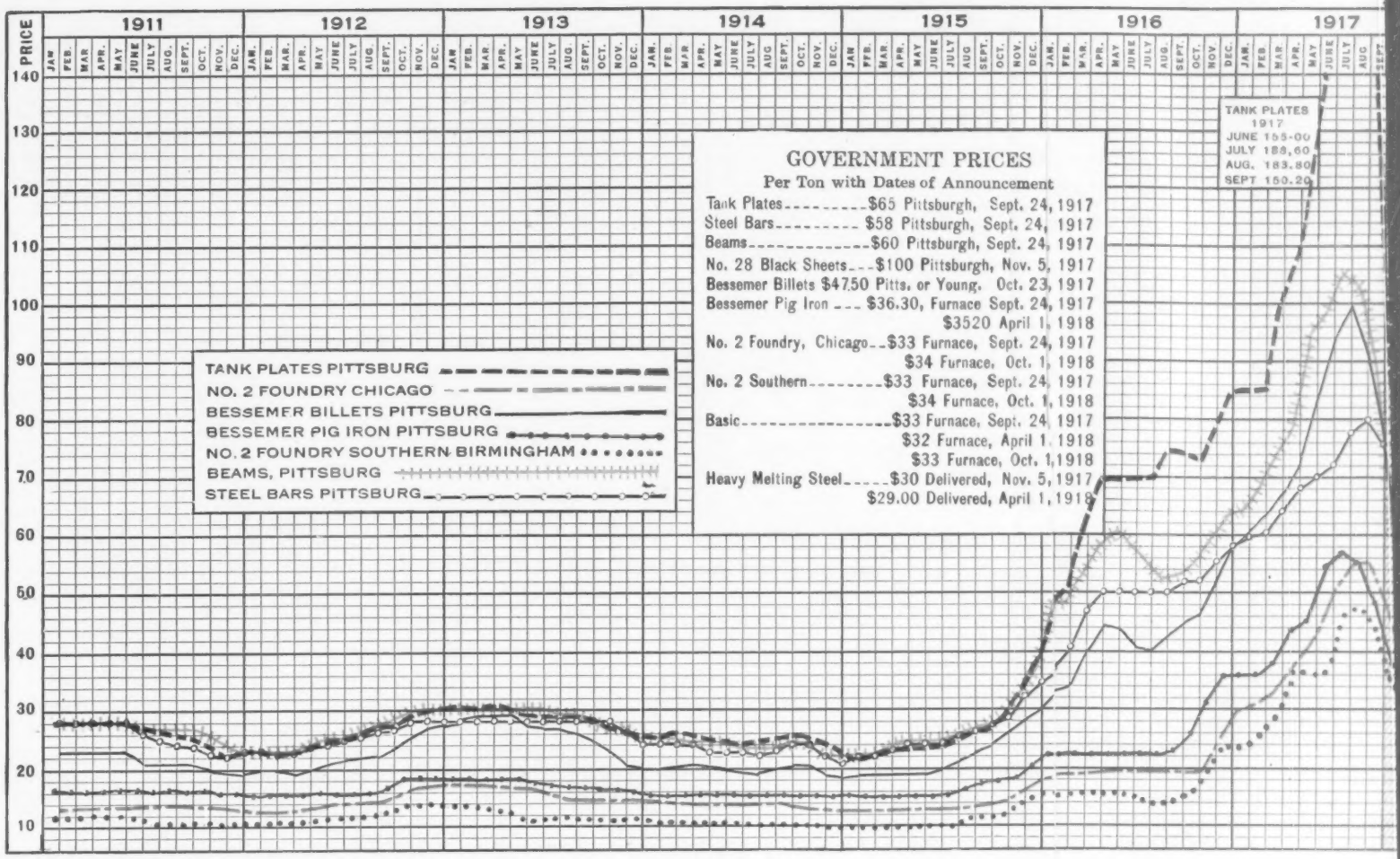
POLITICS, three-cornered politics, actuated wholly by partisan purpose and focusing directly upon the presidential election next November, has ushered in the new year at Washington. Overshadowing all other events of the year 1923 at the capital was the assemblage of congress on Dec. 3 and presumably until its adjournment congress will eclipse all other interests. And, hovering over the great dome on Capitol Hill, a menace to the business community and foe to all economic and wise legislation, is this sinister and very tangible thing called politics.

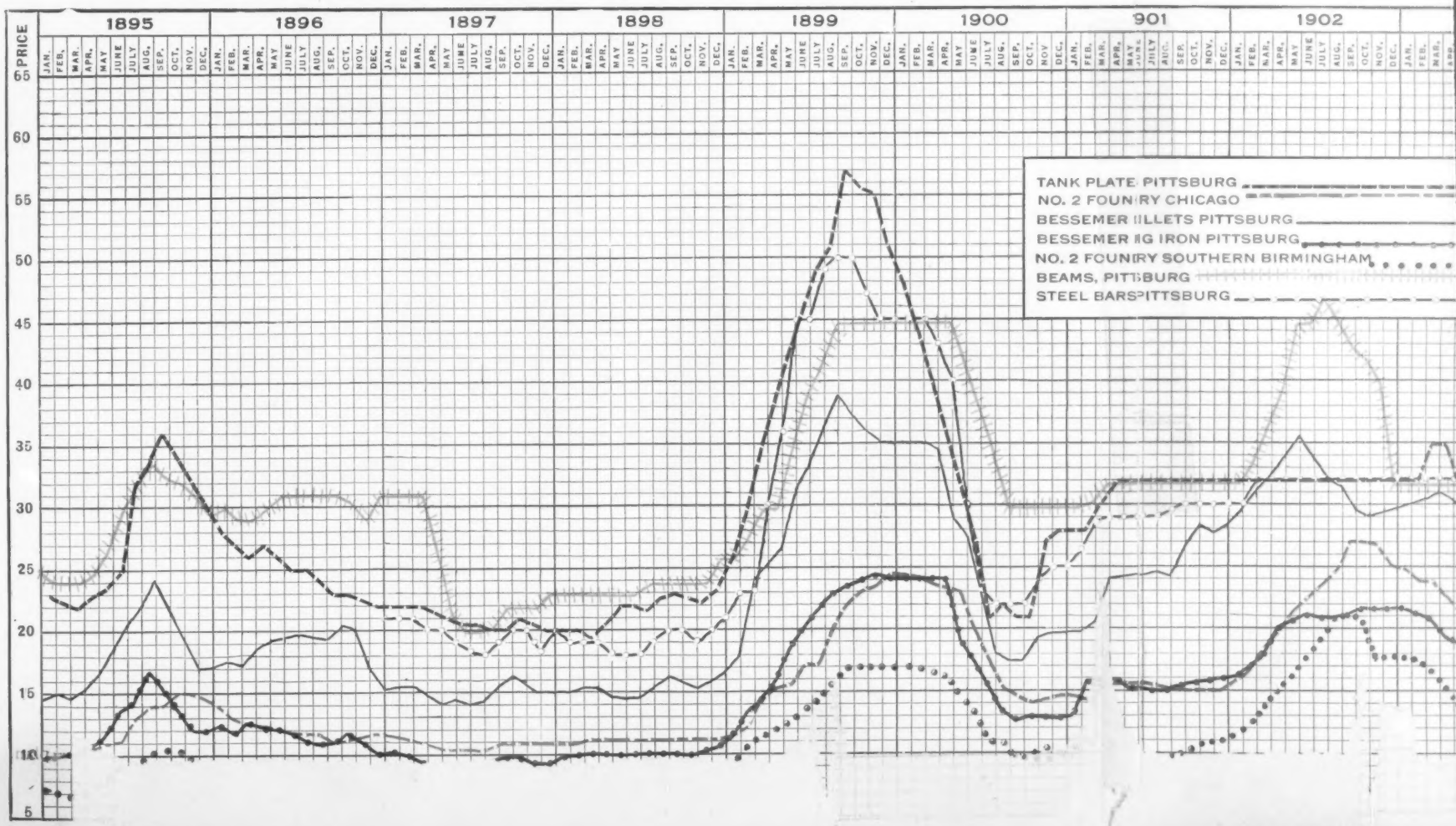
The congress just preceding a presidential election is always unsettled. The major parties maneuver for position. The "ins" seek to avoid controversial ground; the "outs" attempt to make the issue for the oncoming election and enfilade the administration. The disaffected elements try to drive a spearhead between the two major parties and make more secure their own footing. Not economic benefit but practical politics is the yardstick by which all proposals are measured. And usually the outcome is little legislation but a voluminous and caustic *Congressional Record*.

The congress which is now four weeks old is performing on just such a stage. The Republican effort is to hold fast to the presidency, while the Democratic goal is adroitly to block the wheels of progress and direct attention to the necessity for a Democratic occupant in the White House to make possible again a forward movement. Neither the regular Republicans nor the regular Democrats have an outright majority in the senate or the house of representatives. Holding the balance of power in each house is the so-called LaFollette or radical-farmer group. No measure has yet advanced to the position where a test vote is available, but seemingly a coalition of any two of these three elements will be the minimum requirement for legislative success.

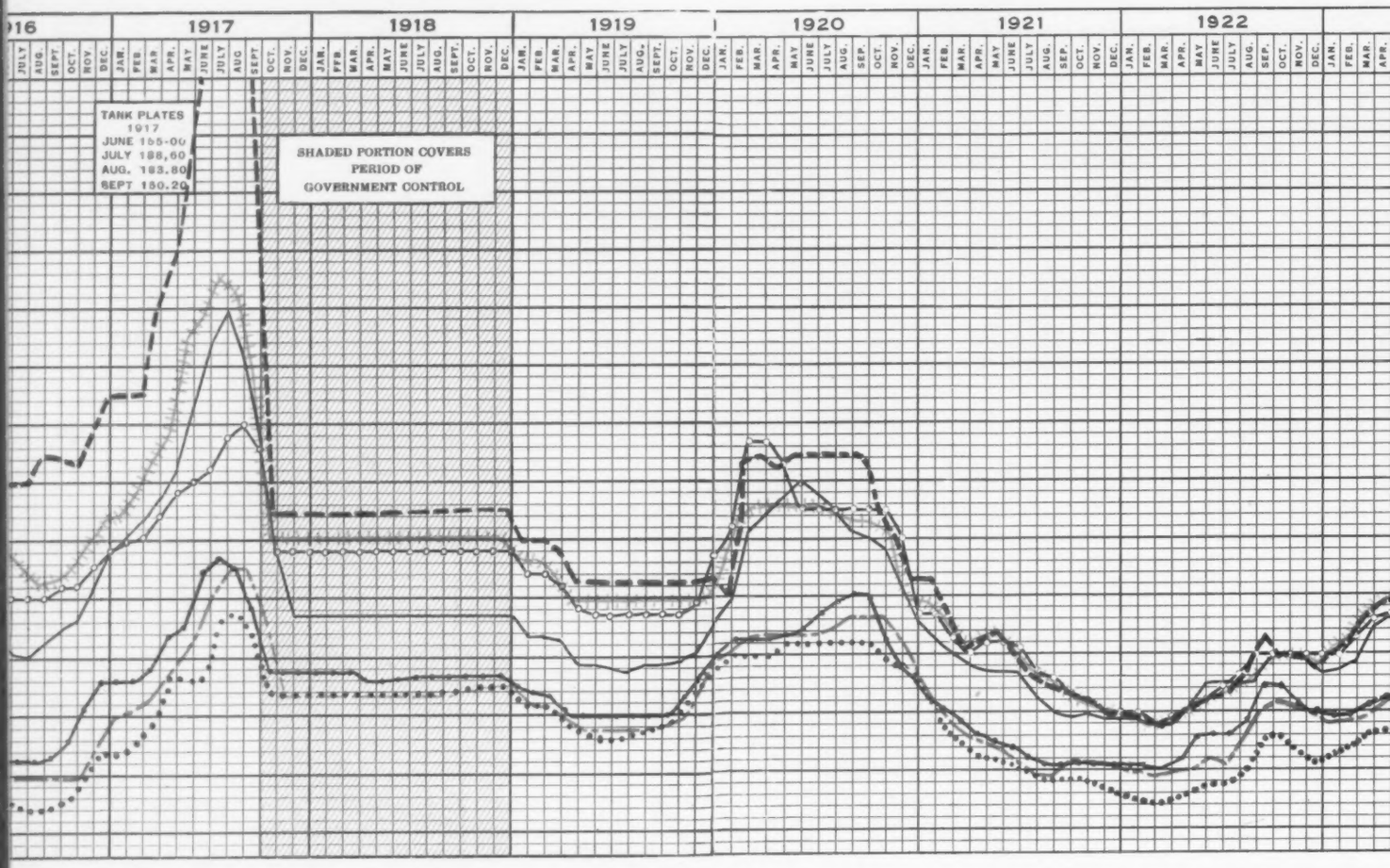
The most important business before congress is taxation. The pronouncement of Secretary of the Treasury Mellon on Nov. 10 for a reduction of $323,000,000 in the nation's annual internal tax bill was a forward, aggressive step by the administration and put it in a distinctly favorable public light. Were it not for the soldier bonus or adjusted compensation issue it would be entirely safe to predict the adoption of the Mellon plan.

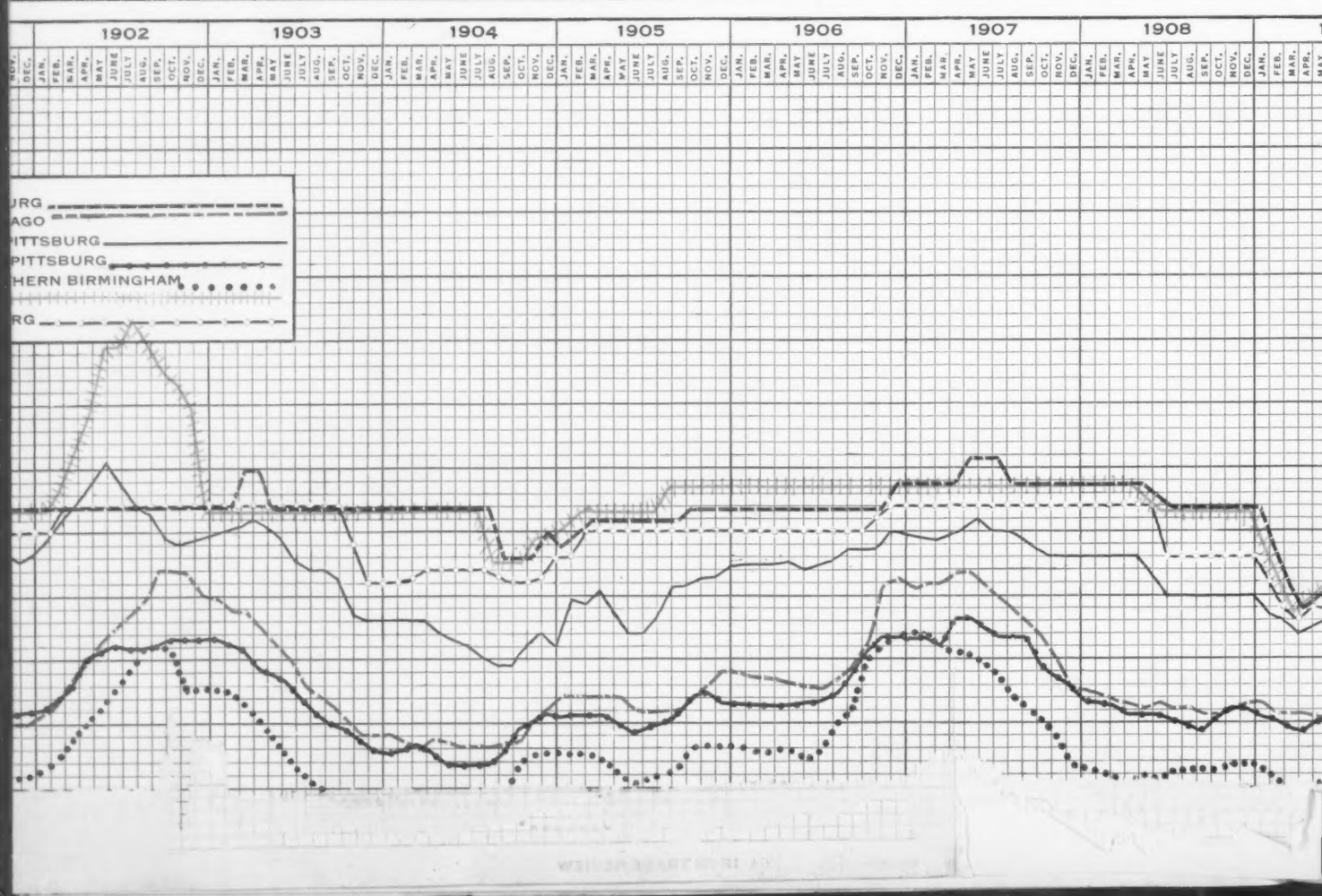
Finished Steel Products Given In Net Tons, Pig Iron and Billets In Gross Tons

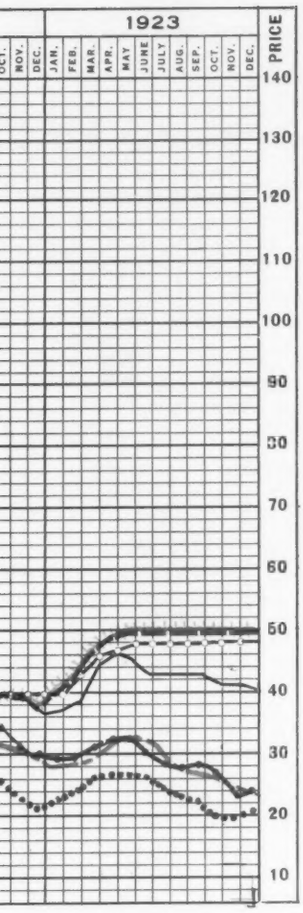




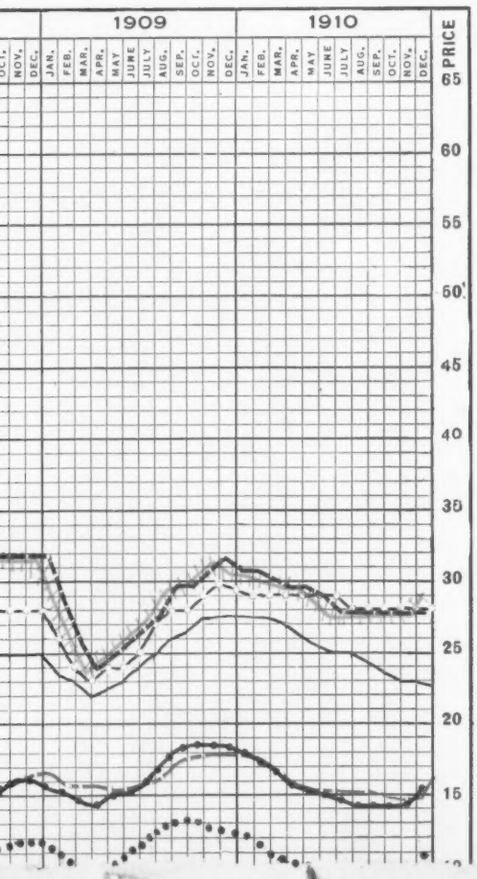
ON REVIEW TRADE







Monthly Fluctuations of Iron and Steel Prices For a Period of Twenty-Nine Years



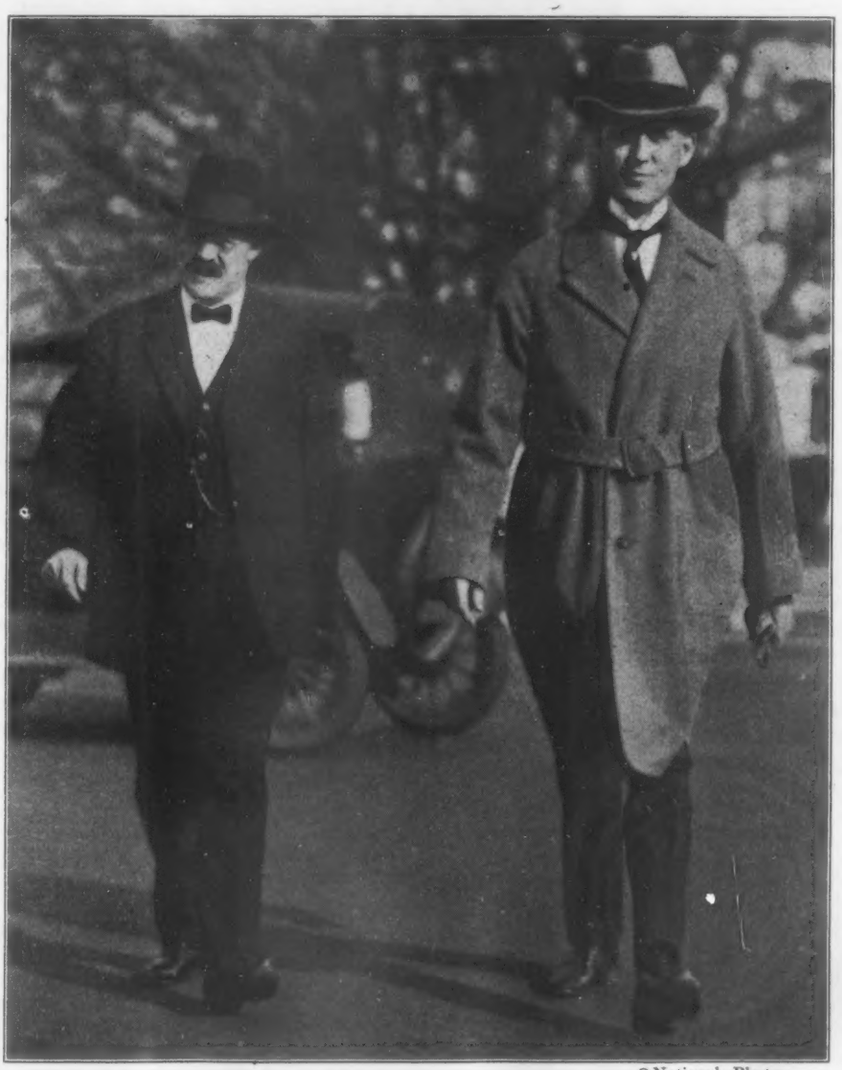
Soldier bonus advocates are divided into two camps. One favors the collateral enactment of a bonus bill and a generous slashing of tax rates, on the theory that sufficient further economies can be effected in national administration to meet the added burden of the gift. The other favors a bonus at the cost of lower taxes, if Mr. Mellon is insistent that the national treasury cannot stand both. Some lukewarm bonus advocates, it might be added, look upon the Mellon warning that congress must choose between reduced taxation and a soldier bonus as a way out of their dilemma.

In his message to congress President Coolidge was especially straightforward and terse in his opposition to the bonus. While there are many indications that some sort of an adjusted compensation bill will be passed, Reed Smoot, chairman of the senate finance committee, predicts that the proposal will be filibustered to death in the senate. At the preceding session of congress the house passed a bonus bill over the president's veto but the senate withheld the few votes necessary for a two-thirds approval of the measure and regulation of the veto. The radical-farmer element is by nature predisposed for a reduction in the rates on smaller incomes but it stands aghast at Mr. Mellon's demand that the maximum surtax be cut down from a maximum of 50 per cent to about 25 per cent. Doubtless a compromise will be arranged making the maximum levy somewhere between 25 and 50 per cent, possibly 35 per cent. The Democratic attitude toward tax reduction is naturally a political one. The left in both the house and the senate cannot afford to obstruct the tax reduction which the entire country is demanding and enter the coming presidential campaign with the onus of defeating the Mellon proposal upon it, nor is it desirous of assisting the Republican party in enacting a measure which the latter can set up as one of its important accomplishments.

The difficulties that loom for this matter of tax adjustment are obvious. The demands of some members of the radical-farmer element that the excess profits tax be restored can hardly be taken seriously. It is inconceivable that the Democrats, who joined with Republicans in repealing this economically unsound impost and hindrance to national prosperity will now be a party to its revival.

Railroad Question Important

Secondary only to taxation in importance is the railroad question. Radical-farmer members of congress blame high freight rates for the difficulties of many of their constituents. Upon the Cummins-Esch act will descend all of the pent-up wrath of the agrarian states. It is their belief that if the act can be revamped and the valuation of the railroads scaled down, lower rates will automatically ensue. On the other hand, some of the friends of the railroads believe that the salvation of the carriers rests in their compulsory consolidation. Legislation both to weaken and strengthen the act is already in the congressional hopper. For the moment the question as to what is to become of the railroad labor board has been submerged by the attacks upon the act, but many still adhere to the belief that the board which is responsible for the chief item of railroad expense, wages, should be more closely aligned to that body which determines the income of the railroads, and that it should be transferred from Chicago to Washington. The transportation problem is one of great magnitude, upon a solution of which the continued prosperity of the country depends. It is estimated that in the next 10 years passenger traffic will in-



©National Photo

MAGNUS JOHNSON and Henrik Shipstead—senators from Minnesota—going to the opening session of congress Dec. 3. Johnson, so-called "dirt farmer" senator, was born in Varmland, Sweden, and has a common and partial high school education. He was connected with many co-operative organizations in Minnesota, and at one time was president of the State Union of the American Society of Equity and vice president of the Equity Co-operative exchange. He secured his election to the United States senate on the Farmer Labor ticket on July 16, 1923, to fill vacancy caused by the death of Senator Knute Nelson. Shipstead, a former practicing dentist, was elected on the Farmer Labor ticket, defeating former Senator Frank B. Kellog, now ambassador to Great Britain.

crease 25 per cent and freight traffic 33 1/3 per cent. To provide facilities and equipment for these increases an expenditure of $7,870,000,000 will be required. The railroads themselves feel their interests would be best conserved by a hands-off policy toward the Cummins-Esch act. While they can suggest many ways of strengthening it they fear that any action they might initiate would lead to unfavorable amendment. Incidentally, the estimated growth of freight traffic is from 420,000,000,000 revenue ton miles in 1923 to 560,000,000,000 in 1933. To handle this increased volume of traffic the railroads must enlarge their equipment facilities in the next decade by 38,350 miles of track, 13,200 locomotives, 725,000 freight cars and 12,300 passenger cars.

Proposes Voluntary Consolidation

President Coolidge in his message to congress urged additional legislation for giving authority for voluntary consolidations of the railroads under approval of the interstate commerce commission; at the same time suggesting committees for each proposed group with power to negotiate with individual security holders for exchange of the stock while also preserving their values. This recommendation coincides with the plan of President Harding announced in his speech at Kansas City while on his western tour last summer. It is embodied largely in the consolidation bill of Senator Cummins of Iowa, chairman of the interstate commerce committee, introduced as an amendment to the Cummins-Esch act. Senator Cummins' measure provides grouping the roads into 15 to 20 systems.

The house committee on interstate and foreign commerce and the senate committee on interstate commerce will take up considerable railroad legislation but whether any important bills will be passed in this session is doubtful. The regular Republicans in congress are expected to assume a defensive position to prevent the passage of various measures sure to be proposed by the radicals. Organized labor has been taking a hand in the controversy over the future of the railroad labor board.

Hope of a reduction of freight rates on a number of important basic commodities, through a general readjustment of rate schedules is held out in some quarters, but the general opinion is that little can be accomplished before congress adjourns for the national political conventions in June.

Predictions of a stalemate in the taxation and railroad questions cannot be made to cover the immigration matter in this congress. By limitation, the present act admitting annually 3 per cent of the number of aliens in this country at the time of the 1910 census will expire on June 30. This necessitates some action by congress at this session. The house and senate immigration committees have their hoppers full of bills. One of the most important before the house committee is that of Chairman Johnson, which would substitute for the present law, restrictions limiting the number of immigrants for any fiscal year from any nation to 2 per cent of that country's nationals in the United States in 1890. This measure which is the result of lengthy study by the immigration committee, divides prospective immigrants into two classes, close blood relationship and other aliens, upon which the quotas would be fixed. Children of American citizens would be exempt from the quota count, as would bona fide students and members of professional classes. Aliens already in the United States having first papers would be able to apply for the admission of husbands, wives and children within quota limitations, while aliens ineligible to citizenship would be denied the right of permanent residence. All prospective immigrants would be examined abroad by American consuls as to their mental and physical qualifications. Provisions are carried in the bill for registration of aliens.

SENATOR SMITH WILDMAN BROOKHART'S pride suffered when alleged slander damages by him were set at 30 cents. Iowa's radical senator boasts of six children, rifle prowess and log-cabin birth.

©Harris & Ewing

IN ADDITION to a nonpartisan slant Senator Lynn Frazier possesses a will. When recalled from the governorship of North Dakota he resolved to confound political enemies and come back. He has.

Another bill, by Congressman T. W. Phillips, Pennsylvania, seeks to limit immigrants for any fiscal year to 500,000, and would place the final determination of the number of aliens admissable in the hands of the commissioner general of immigration, whose duty it would be to take into consideration at the time the industrial condition of the United States and the number of unnaturalized persons returning to their home lands. Then there is the bill of Secretary of Labor Davis to register all aliens, to further assimilation of foreigners and to curb alien bottlegging try which has sprung up on the borders. The 3 per cent act admits about 875,000 aliens annually. It is scarcely conceivable that advocates of increased immigration will be successful.

Coal and Shipping Twin Troubles

Coal is a problem that has risen to smite every congress in recent years. A problem it would rather avoid is presented in the report of the federal coal fact-finding commission, which expired by limitation last Sept. 22. The commission was created by the preceding congress to get the facts about the coal industry and typified public resentment over the twin coal strikes of 1922. The commission recommended that the troublesome coal situation be handled by a special division of the interstate commerce commission, to set up regulations and license those engaged in interstate transportation of fuel. Under the Cummins-Esch act the commerce commission now has power to give preference to certain classes of freight in times of emergency and to limit or entirely cut off the supply of freight cars for the transportation of nonessentials

during periods of war or national stress.

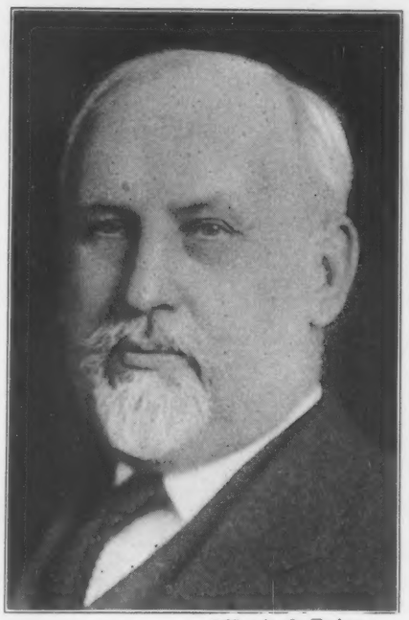
The concensus among members of the commerce commission is that body now has sufficient difficulty governing the railroads, let alone assuming the thankless task of policing the coal industry. It is quite likely that the recommendations of the coal commission will fall by the wayside. The commission proved a disappointment; it was powerless to prevent the anthracite strike of Aug. 1, 1923, and impotent to effect a settlement once the miners struck.

Reorganization of the federal departments is another hardy annual. Except that he favors continuance of the war and navy departments as separate entities and one or two minor changes in the reorganization committee's proposals, President Coolidge is behind the Brown plan. That congress will find time for consideration of reorganizing the departments is improbable.

Test For Coolidge

Reviewing events of 1923, the passing of President Harding early in August was a loss that fell heavily upon business and industry. At the same time it gave added proof that the government of the United States is elastic and can withstand an unlooked-for change in executives without disturbance. To the leaders in the iron and steel industry the late President was a familar figure, and although he had occasion at least twice to differ with them, the fearlessness of his position won admiration. It was only a few weeks prior to his passing that the late President strongly urged the abolition of the 12-hour day in the steel industry. He went contrary to the majority opinion of the industry in standing firm for restrictive immigration, but in the succession of Calvin Coolidge the country gained an executive equally as conservative as his predecessor.

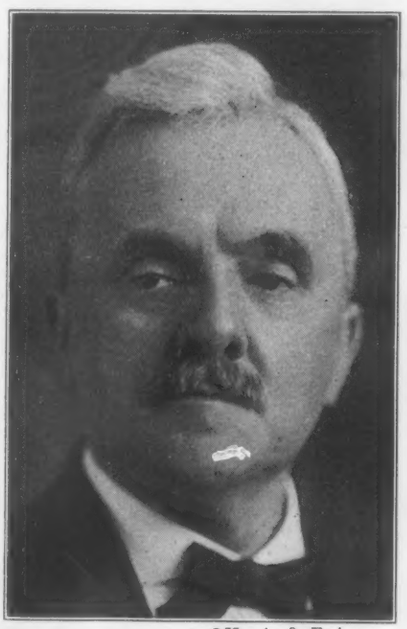
The federal trade commission's campaign against the iron and steel industry continued undiminished in vigor in 1923, but at a slightly slower pace. On Jan. 2 the appellate court of the District of Columbia affirmed the permanent injunction of the supreme court of the district in the Claire furnace iron and steel cost reporting case. This made the second court in succession to hold that the trade commission has no authority to demand the submission of monthly production cost reports by iron, steel and coke producers. On March 17 the trade commission appealed this case to the Supreme Court of the United States. Late in November a brief sustaining the trade commission's position was filed in the Supreme Court and the case was argued in December. On March 6 the supreme court of the district made permanent its temporary in-



©Harris & Ewing

SENATOR EDWIN F. LADD, of Fargo, North Dakota, was elected as a Republican backed by the Nonpartisan League. Since he has been in the senate he has been only a mild insurgent, but cannot be counted upon as a regular.

junction in the Maynard coal cost reporting case, involving for the coal industry substantially the same issue as in the Claire furnace case for the iron and steel industry. The trade commission has appealed the Maynard coal case to the appellate court of the district. On Jan. 26 the trade commission dismissed its complaint against the



©Harris & Ewing

GEORGE W. NORRIS entered congress in 1903 a radical. Today's radicals classify Nebraska's senior senator nearer a Lodge neutral than a LaFollette red, but willingly claim his vote.

Bethlehem-Lackawanna merger and issued a new complaint, blanketing the commission's objections to the Bethlehem-Lackawanna-Midvale merger. Hearings on the complaint now are in progress.

By early summer of 1923 the defense in the Pittsburgh basing point action of the trade commission had been submitted, and the final argument of the case got under way in December, with more than 30 western and Middle Western states actively on the side of the commission. A decision by the trade commission proper in this case, which makes only the United States Steel Corp. defendant at this time but involves all independent producers, is likely to be made in 1924.

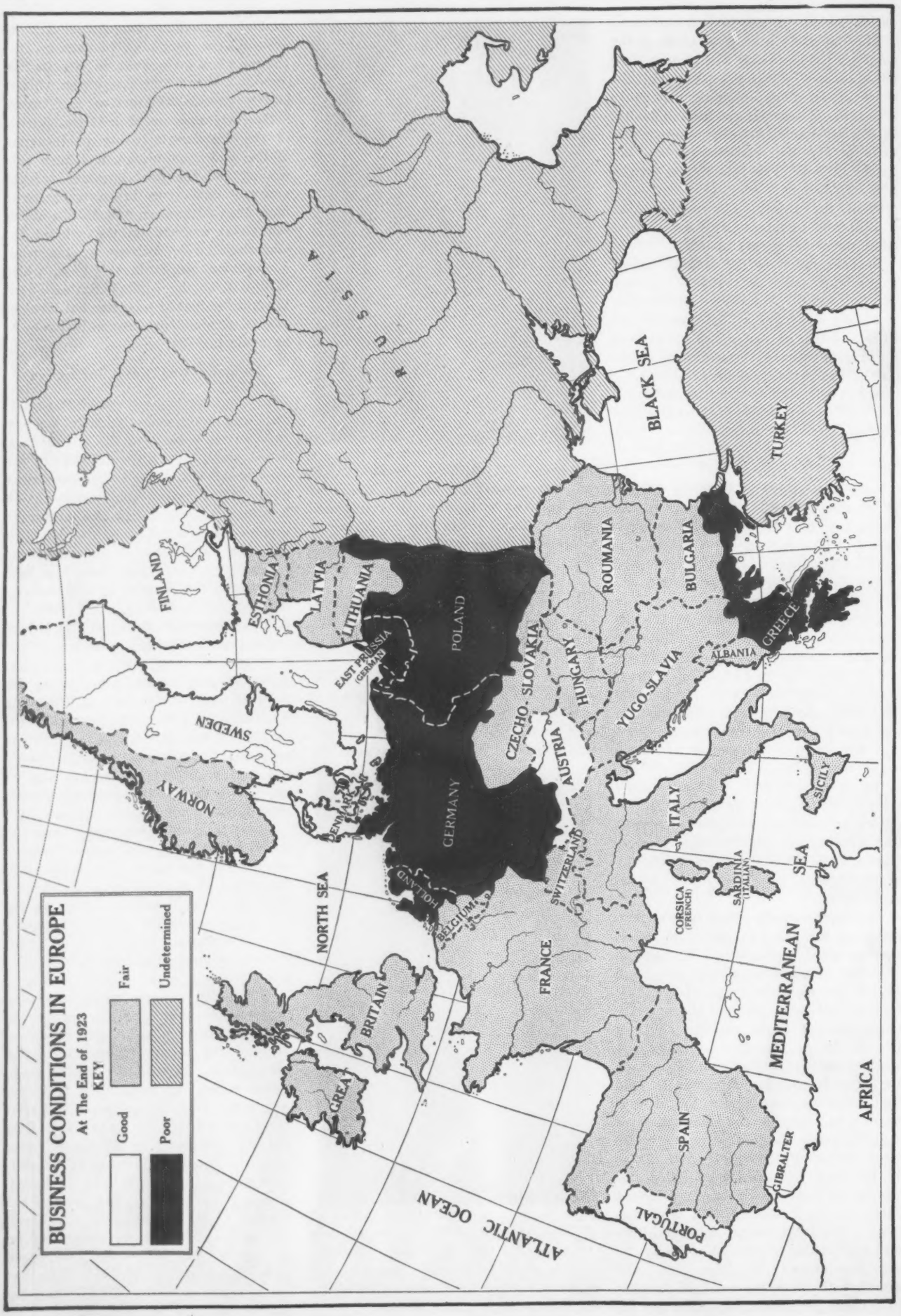
Assigned Car Case Ineffective

The outstanding action of the interstate commerce commission in the past year was in respect to the so-called assigned car case. It held that private-owned cars must be thrown into a pool with railroad-owned cars in the allocation of equipment to coal mines. Although the new ruling was to have become effective in the fall the commission reheard the case and since has been postponing the effective date of its original order every 30 days.

The events of the year tended to prove that the flexible provisions of the Fordney-McCumber tariff will not flex. Although producers of pig iron on the Atlantic coast complained of the influx of European iron and asked that the duty of 75 cents per ton be increased by an amount equivalent to the entire 50 per cent permitted by the act, the investigation to ascertain production costs abroad was not initiated.

Domestic production costs were obtained but a division of opinion among members of the tariff commission as to the extent they could go under the act blocked not only further action on pig iron but also on the steel cost inquiry which the metals division of the commission thought should be made parallel with pig iron.

Despite the meager appropriations of congress for enhancing the service of the department of commerce to industry, the iron and steel division broadened its activities. The 22 new foreign trade offices which the department is planning to establish abroad, seven in Latin-American quarters, five in the Near East and the remainder in European countries will be opened July 1 provided congress allows the appropriation requested. During the year the scaling down of the number of federal employes continued, and on June 30 the government had on its payroll 548,531 persons, compared with 917,760 on Nov. 11, 1918. This was an increase over the 438,057 drawing salaries on June 30, 1916.


BUSINESS CONDITIONS IN EUROPE
At The End of 1923
KEY
Good
Fair
Poor
Undetermined
RUSSIA
BLACK SEA
TURKEY
FINLAND
ESTHONIA
LATVIA
LITHUANIA
POLAND
EAST PRUSSIA (GERMANY)
ROUMANIA
BULGARIA
GREECE
ALBANIA
YUGO-SLAVIA
HUNGARY
CZECHO-SLOVAKIA
AUSTRIA
SWEDEN
NORWAY
DENMARK
GERMANY
SWITZERLAND
ITALY
SICILY
SARDINIA (ITALIAN)
CORSICA (FRENCH)
MEDITERRANEAN SEA
HOLLAND
BELGIUM
NORTH SEA
FRANCE
BRITAIN
GREA
SPAIN
GIBRALTER
PORTUGAL
ATLANTIC OCEAN
AFRICA

Business Bringing Hope to Europe

Production of Essential Commodities at Higher Level Than Year Ago — Exports Increase Despite Collapse of Germany

BY H. COLE ESTEP
European Manager, Iron Trade Review

Cologne harbor, a great transfer point for Europen commerce. Cologne, under British control, has been relatively undisturbed

ONLY rich and prosperous people could support such quarrels as are now raging in Europe. The American business man who is wondering to what extent the unending strife of the Old World is going to affect his profits in 1924 would do well to bear this simple fact in mind. Europe enters the sixth year of "peace" with more scores to settle than at any time in the past half century, the period 1914 to 1918 alone excepted. France and Germany still are at each other's throats, while the latter country is torn with internal dissensions; the southeast corner of the Baltic around Memel is seething; the Balkans rumble; Italy growls at Greece; Spain is conducting a war of no small proportions against the Moors, and Poland is scarcely on speaking terms with half her neighbors. This by no means exhausts the catalog of European quarrels. Strife engendered by age-old animosities is rampant everywhere on the Continent.

There is no need to go into detail. Every American who reads newspapers is familiar with the troubles of Europe. But of the *work* which is being done in the Old World; the pig iron made and sold, the coal mined and consumed, the ships sent on paying voyages, the new industries started, the crops raised and harvested, the money earned and invested, much less is told. Yet these are facts in which the American business man is interested, because they are the measures of the support Europe can be counted on to give American industries during the next year or so.

A consideration of Europe at work reveals more tendencies of a hopeful character than the reverse. The plain fact is that business in Europe today is not so bad, and is improving. The real business situation abroad does not support the view of a prominent British colonial politician that "the economic and industrial structure of Europe is cracking in all directions." Such a remark only reveals the bias of the political mind when called upon to give a business judgment. It is based on an exaggerated idea of the effect of political disturbances and controversies, short of actual war, upon trade.

Unfortunately politics everywhere has too much influence on commerce and political factors are only too likely to mar an otherwise favorable business situation. This is true in the United States. It is truer in Europe. Fortunately it is not the whole truth. Trade has a way of flourishing despite political wrangling, for people must live, move about and consume manufactured articles and natural products, even under the worst conditions. In Russia in the darkest hours the volume of internal trade was large.

No Thought of Suicide

To talk about Europe being on "a pilgrimage of suicide" is nonsense. In 90 per cent of Europe today conditions are normal, business is better than it was a year ago, and still is improving slowly.

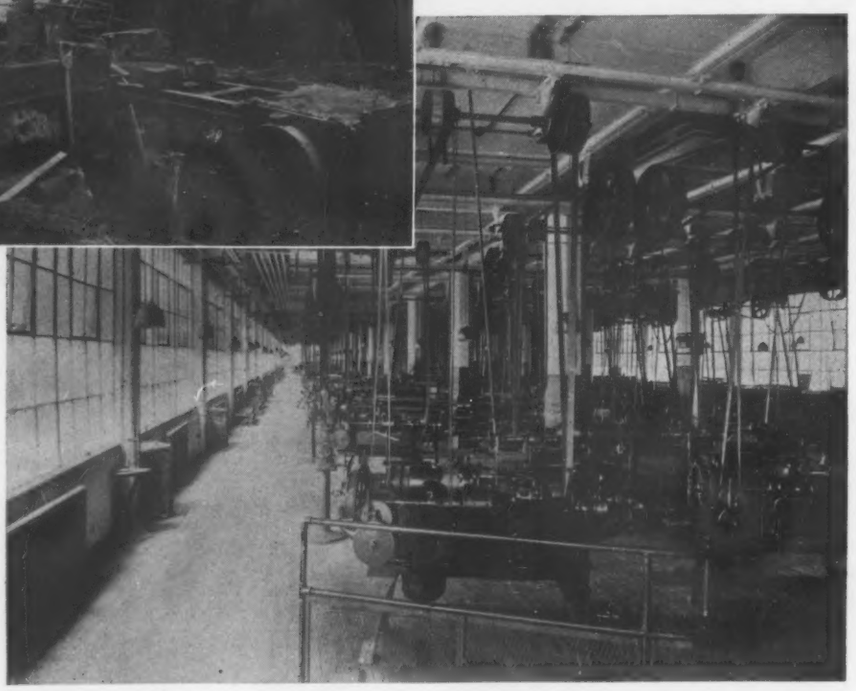
It is fortunate that European commerce is not in the awful condition which political scaremongers would lead one to believe, for outside of our home market, Europe is America's largest customer. How large relatively few people appreciate. In 1922, according to department of commerce figures, 54 per cent of our total foreign sales went to Europe. Almost half of this business is with the United Kingdom. In considering the bearing of European buying on our domestic situation, this fact should not be overlooked, for the stability of England is acknowledged on all sides. Not even the most gloomy of our irreconcilable senators who made such exhaustive studies of European economic conditions last summer from the cafes of Paris and Rome, and the windows of railroad cars, but is willing to admit that Britain is not crumbling.

In the first half of 1923, according to official figures, the United Kingdom bought $482,000,000 worth of American goods, while for the whole of last year British purchases in America were close to a billion dollars. The total buying in America in the year just closed, of a Europe "plunging headlong to ruin," was around $2,000,000,000. This is a fairly sizable bill for a pauper. A moment's reflection over these facts will show how much credence should be given some of the extremely pessimistic opinions regarding European affairs which have received more than usual attention lately.

The volume of American trade with Europe, both export and import is so large that American business men are more and more compelled to keep in touch with conditions abroad. Changes in the European business situation are reflected to a greater or less degree in almost every branch of American industry. In the agricultural field, with Europe taking half of our cotton crop and a third of our wheat production, the effect of European conditions on American prosperity is direct. The oil business also is directly affected by the European situation; as is the lumber business and the copper industry.

As all these great lines of business respond to the ebb and flow of the European commercial tide, so do they in turn influence the course of the steel

trade of the United States. The influence of the European situation on the American iron and steel industry is no less real because it is largely indirect. Business conditions in Europe constitute one of the factors which the American iron and steel producers and manufacturers of machinery must take into consideration in forecasting the business trend in their own lines of endeavor during the coming year. It is not a decisive factor but it is an important one. With other conditions fairly evenly balanced as between the favorable and unfavorable, the European factor, although operating indirectly, might easily turn the scale between profit and loss, or between mediocre success and prosperity. A fair knowledge of the European situation is an essential part of the business equipment of the American business executive.



WHY BUSINESS VARIES IN EUROPE

A European gray-iron foundry whose owners wonder why they lose money, and, at the right, a modern European machine shop properly equipped.

Will Continue to Buy

In a general way, the statement may be advanced that in 1924 Europe will continue to be a good customer of the United States. There is a fair possibility that any loss of trade which may be experienced from Germany, on account of the Ruhr imbroglio, will be made up in other directions, so that a year from now it will be found that Europe has again bought about two billion dollars worth of American raw and manufactured products. While the situation probably will work out along these lines, the menace of unfavorable political developments cannot be ignored. The worst of this side of the question is that no one can foretell what the trend may be. Depending as it does for its direction largely on the emotional reactions of large masses of people, politics constitutes an unknown factor in the situation. Therefore, one is forced to say that *except* for political complications there is every likelihood of continued progress in European business this year, with corresponding benefit to the United States.

Fortunately powerful influences are at work, especially in the direction of cooperation between the United States and Great Britain, to arrest and control the tendency in Europe toward political disintegration. How far they will succeed remains to be seen.

The Franco-German quarrel is the most dangerous political factor in the situation. If it could be settled, or even allayed temporarily, the condition of Europe would soon become stabilized. But even at the worst it has yet to be demonstrated whether the disruptive tendency of the quasi state of war between France and Germany is sufficiently strong to overcome the constructive forces which also are at work. The trouble with most of the reports on the European situation which have been circulated in America is that the destructive side has received almost all the attention, being by far the most spectacular.

Millions Are Producing

In Europe a number of strong countries are not concerned with military adventures, but are as far as possible devoting themselves to plain ordinary hard work and to increasing production. These countries include Great Britain, Holland, Norway, Sweden, Denmark, Finland, Esthonia, Latvia, Spain, Italy, Switzerland, Czecho-Slovakia and Austria. Their combined population is 135,000,000. Here is a group of people larger than that in the United States who are engaged almost exclusively in productive operations. Add to their efforts those of the French and Belgians, who in spite of the Ruhr adventure have not yet suffered any business reverses, and it becomes plain why, in the face of a sea of trouble, more business is being done today in Europe, as a whole, than a year ago.

Furthermore the production of certain essential basic commodities is larger today in Europe that at any other time since the end of the war. The quarrels of Europe are troublesome enough, but fortunately they have not engulfed the entire continent. There are plenty of people in the Old World whose efforts are being devoted to production and trade.

On another page in this issue is an

estimate of the world's iron and steel production for last year and previous years. These figures show that the pig iron production of Europe in 1923 was nearly a million tons larger than in 1922, despite the collapse of output in Germany. Preliminary estimates made at the time this article was written indicate that last year Europe, except Russia, made 22,427,000 gross tons of pig iron, compared with 21,715,000 tons in 1922, and 15,824,000 tons in 1921. Russian production, which was 15,000 tons in 1920, was 125,000 tons in 1922 and about 320,000 tons last year. Progress has been steady for the past three years.

German production of pig iron last year showed a drop of around 2,500,000 tons. On the other hand France is producing more pig iron than before the war. Leaving out Germany we find that western European pig iron production increased last year by 3,200,000 tons over 1922, or 20 per cent, and by 8,700,000 tons over 1921, or 20 per cent. Pig iron is a basic commodity, and an increase in its production means an advance in business generally. There has been a remarkable revival in pig iron output in every country in Europe except Germany compared with the low water mark of two years ago. This is one of the facts which show that business in Europe is making progress despite enormous obstacles.

More Exports and Imports

Turning to foreign trade in iron and steel, we find that the sum of the exports and imports, that is the total foreign trade of the four principal European countries, Great Britain, Germany, France and Belgium, was 9,460,000 tons in 1921, 13,121,000 tons in 1922, and 13,600,000 tons in 1923. This also reflects steady growth since the slump of two years ago. Leaving out Germany, we find that France, Belgium and England have made big gains, their combined exports and imports increasing from 6,700,000 tons in 1921 to 8,900,000 tons in 1922, and 10,623,000 tons in 1923. Considerable business lost by Germany has been secured by her neighbors.

Outside Germany the coal production of Europe last year was about 384,000,000 tons compared with 347,000,000 tons in 1922, an increase of 10 per cent. Germany lived off stocks and imports, her output on account of the occupation of the Ruhr dropping about 50 per cent below the 1922 figure of 125,000,000 tons.

Carefully prepared statistics showing the total weight of imports and exports from the principal countries of the world are published by the league of nations. These figures are useful for gaging the true state of trade in Europe. They show that the commerce of practically every European country is on the upgrade, Germany alone excepted. The condensed figures for exports only are as follows:

Country	Monthly average In metric tons during Autumn of 1923	The year 1921
Belgium	1,502,000	1,430,000
France	1,921,000	1,336,000
Holland	734,000	476,000
Spain	770,000	767,000
Switzerland	50,000	46,000
Greece	17,000	27,000
Roumania	239,000	177,000
Poland	1,464,000	169,000
Czechia	1,116,000	804,000
Hungary	64,000	70,000
Serbia	216,000	124,000
Latvia and Esthonia	70,000	28,000
Germany	890,000	1,714,000
Total	9,053,000	7,168,000
Total except Germany	8,163,000	5,454,000

The increase in the past two years is seen to be nearly 30 per cent for the whole of Europe and 50 per cent for that portion of the continent outside Germany. This indicates the improvement in the real wealth of the Old World since the war. The figures do not include those for the United Kingdom, because the British board of trade has stopped compiling figures showing the total weight of imports and exports. According to value, British exports are now about on the same level as in 1921, but since prices have been reduced especially for iron, steel and coal, the weight of exports, that is the volume of business, is about 20 per cent greater. Up to the present the tendency of English and most other European export trade is to expand.

Still Behind Prewar Record

It may be more readily understood how this is possible, despite the German situation and other political difficulties, by bearing in mind that although the trend at present is toward a larger volume of business, Europe still is considerably behind her prewar record. The monthly average of exports in 1913 for the countries given in the table, except Germany, was 9,423,000 metric tons, or about 12 per cent more than at present. But Germany's exports alone before the war were 6,143,000 tons a month, making the total for continental Europe 15,566,000 tons. The total volume of trade moving at present is about two-thirds of this figure. It cannot be claimed that Europe is doing a normal business, but since the war, the tendency has been in the right direction, and most of the losses have been in Germany. There has been a great shifting around of trade, which has caused big individual losses in many cases. There have also been large individual profits, and as a whole Europe outside Germany is not doing so badly to have a volume of business, measured by weight of exports, of 90 per cent of prewar.

Other facts support the view that the European iron and steel industry is making progress. In England the value of all iron and steel stocks listed on the London stock exchange was 74.6 per cent of par on July 31, rising to 75.3 per cent at the end of August, to 78 per cent on Sept. 14.

Further statistics based on the movements of shipping, new capital issues, bank discount rates, bankruptcies, etc., might be presented, but they would only reflect with variations what already has been given covering iron and steel production, coal output and exports in general. Bank rates in most European countries, ex-

Business in Europe

WITH this issue IRON TRADE REVIEW *inaugurates another new feature—a survey of general business conditions in Europe in the form of a map showing areas of good, fair and poor business. Accompanying the map is a clear-cut analysis of the situation abroad from the standpoint of its reactions on American business. The people of the United States are somewhat fed up with Europe's troubles and the constant cries of "Wolf, Wolf!" by irresponsible political scaremongers.*

What the American industrial leader wants are the plain facts about the European business situation, without political "dope." Instead of the assertion that the Old World is "crashing down the slope of destruction," he would rather know that Europe made and sold more pig iron in 1923 than in either of the two previous years; that the weight of her exports is increasing; and that bank rates as a rule are lower than in 1913.

These facts about Europe, which have a direct bearing on the American industrial situation, are boiled down and summarized in the accompanying chart of general European business conditions. Similar charts, or maps, will be published at appropriate intervals throughout the coming year as a part of the Business Trend section of IRON TRADE REVIEW. *They will form reliable indicators of the European situation from the business standpoint. Their production is possible only because of the complete European editorial staff of this publication.*

cept Scandinavia, now are about the same as, or actually lower, than in 1913, which would indicate a fairly easy credit situation. Money can be had if there is business to be done.

A Question of Judgment

Based on the facts, coupled with an appraisal of other and imponderable factors which depend purely on the judgment of the observer, it is possible to make a general survey of the European business situation with special reference to the iron and steel industry. The results of this survey are given in the map of Europe which accompanies this article. The general condition of business in each European country is indicated on this map, according to whether it is considered to be good, fair or poor. An effort is made to be strictly impartial and to bring to bear the best opinion available. Statistics are useful to indicate trends, but at the best they represent the situation as it was rather than as it is. Also there are important factors in business which cannot be indicated by figures, such as the morale of the workers, the effect of political uncertainties, etc. In the last analysis an evaluation of the business situation at any given time depends on judgment.

In general, as the map presented herewith shows, European business may be said to be fair at present. Outside Germany the trend at the beginning of the new year is rather favorable than otherwise. Were it not for such a low political barometer, business would now be good in many parts of Europe. At all events it does not look as if the European situation would become a sufficient drag on American business during the year to have a decisive effect in any way.

No doubt if business in Europe were better, it would be better in the United States. Poor wheat and copper exports, coupled with low prices, to mention only two items are unfavorable factors in the domestic situation. But on the whole the ability of Europe to absorb American produce is being fairly well maintained. The loss of business in copper and other items can be traced almost exclusively to Germany, but this has its compensations through the elimination of German competition in other directions.

Theoretical economists who hold that the collapse of business in Germany will bring Europe to ruin and create a serious situation in other parts of the world can point to little in support of their beliefs up to the present. To a degree, their fears are true as affecting trade in commodities which Germany imports in large quantities, such as copper, raw rubber, coffee, etc. The world's commerce in these raw materials is depressed as a result of the withdrawal of German demand, and this depression is transmitted to business in general. But there is a counterpoise which tends at least in part to balance the general situation.

The whole world is not going to stop because some part of it is in trouble, and therefore trades in which Germany is prominent as an exporter are actually stimulated by the loss of production in the Reich. In this category we find iron and steel, coal, chemicals, paper, and other basic commodities. It is absurd to say that the iron, steel and coal business of the world outside Germany has not been benefited by the stoppage of the Ruhr. Huge orders for all these commodities have been received by American and European producers from customers in and out of Germany who ordinarily buy from plants in the Ruhr.

In Great Britain where the complaint about poor business conditions arising from unemployment is loudest, the largest gains have been registered. British pig iron production increased 50 per cent last year over 1922, her coal output went up 10 per cent, her exports of coal are on a prewar scale, and she ended the year with a steel production in excess of the prewar rate.

America has obtained coal business in Italy and the Baltic which she could not touch in 1922 when German mines were operating. Many thousands of tons of American blast furnace coke has been shipped all the way from Connellsville to France and Germany. Japan in her extremity has turned almost exclusively for her unexpected requirements of iron and steel to the United States, Great Britain and Belgium. Some business has been placed with Germany but it is less than 10 per cent of the total. All this tends to stimulate those lines of activity in the United States in which readers of Iron Trade Review are directly interested.

The Problem for 1924

The whole problem of the interplay of trade forces in a disturbed postwar world is extremely complex and no single economic formula can be made to apply to it. The business man must judge from practical effects. Up to date he finds that the loss of business with Germany in certain lines has been made up by gains in other lines in which German competition is usually a large factor. On balance the general European business situation is holding its own despite the condition of Germany, but it is possible, of course, for the external reactions to Germany's deplorable internal conditions to become more serious. This is what the business world and the governments of the western nations should try to prevent in 1924.

To what degree they will succeed depends on the development of major political factors. The situation in the Ruhr, the Rhineland and Germany in general has great potentialities for trouble. Business so far has weathered the storm fairly well, and is expected to ride out the gale. But anarchy breeds anarchy. The disintegration of states may be only a precurser to the destruction of their social fabric.

No Threat to Commerce

The threat in the European situation does not enter the sphere of commerce except as commerce may be engulfed in the fall of the social system. If the European social system fails, America will maintain hers only with the greatest difficulty. Here lies the real menace from the Old World. That there are forces tending to undermine the social stability of Europe admits of no doubt. They are being strongly reinforced by the uncertainty surrounding the reparations situation, the indifference of most continental powers toward the settlement of their debts, and the dubiousness of France's real aims along the Rhine.

Insofar as there has been no advance in the past year toward a settlement of any of these questions, with the single but important exception of the British debt to the United States, the world of business enters the new year under a big handicap. But fortunately the forces of commerce are strong. It will take a good deal more to upset business than has occurred up to date. Without overlooking the inherent possibilities in the world situation, what the American business man should keep in mind is the fact that in addition to the great forces working for business stability in North and South America, there are at least 13 European countries with a combined population of 135,000,000 highly intelligent, industrious people who have set their faces against further military adventures and are interested only in continuing the progress of the past two years until their prewar prosperity is fully restored.

1923 Iron Output a New Record

Production of 2,905,806 Tons in December Brings Year's Total to 40,019,129 Gross Tons—Exceeds 1916 High Mark Output by 1,000,000 Tons—Furnaces in Operation on December 31 Totals 231

PRODUCTION of coke and anthracite pig iron in the United States during 1923 totaled 40,019,129 gross tons, thereby establishing a new high record, exceeding that of 1916 by 1,000,000 tons. The output for December, just compiled from complete estimated reports from blast furnaces, aggregated 2,905,806 tons, a gain of nearly 15,000 tons over November. Average daily production, however, showed a loss of about 2600 tons per day and indicated a check in the declining production of recent months. Stacks in blast on the last day of the month showed a gain of one over the number active on Nov. 30.

MONTHLY PRODUCTION

	1923	1922	1921
January	3,228,226	1,645,804	2,414,753
February	2,993,918	1,630,180	1,929,394
March	3,523,595	2,035,908	1,594,866
April	3,546,308	2,070,161	1,190,751
May	3,868,486	2,309,348	1,215,272
June	3,667,868	2,362,455	1,064,007
Total 1st half.	20,828,401	12,053,856	9,409,043
July	3,684,677	2,403,030	864,642
August	3,448,886	1,810,665	954,901
September	3,117,526	2,024,008	985,795
October	3,142,642	2,629,655	1,234,450
November	2,891,191	2,846,110	1,414,958
December	2,905,806	3,083,520	1,642,775
Total 2nd half..	19,190,728	14,796,988	7,097,521
Grand total..	40,019,129	26,850,844	16,506,564

The actual production of pig iron in December was 2,905,806 tons, a gain of 14,615 tons over the 2,891,191 tons of November. On an average daily basis, this was a rate of 93,736 tons per day, as compared with the 96,373-ton rate of the preceding month, the loss being 2637 tons per day. This rate was the lowest since October, 1922, when the average daily production was 84,827 tons. With the decline in December the average daily pig iron production has dropped for seven consecutive months, the loss being 31,054 tons, or 24.9 from the high point of 124,790 tons per day reached in May.

Merchant pig iron produced in December totaled 709,127 tons and, compared with the 726,686 tons of November, was a loss of 17,559 tons. Reduced to an average daily basis, this represented 22,875 tons per day and a loss of 1348 tons from the 24,223-ton daily rate of the preceding month. Nonmerchant or steelworks iron production, however, totaled 2,196,679 tons, a gain of 32,174 tons over the 2,164,505 tons of November. This represented a daily rate of 70,861 tons in December, as against 72,150 tons in November, the loss being 1289 tons per day.

AVERAGE DAILY PRODUCTION

	1923	1922	1921	1920	1919
Jan.	104,136	53,090	77,895	97,172	106,654
Feb.	106,925	58,220	68,906	102,904	105,120
March	113,664	65,674	51,447	108,895	99,614
April	118,210	69,005	39,691	91,754	82,479
May	124,790	74,495	39,202	96,510	67,991
June	122,262	78,748	35,466	101,553	70,467
July	118,860	77,517	27,892	98,190	78,200
Aug.	111,254	58,408	30,802	101,468	88,453
Sept.	103,917	67,466	32,859	104,143	82,692
Oct.	101,375	84,827	39,821	106,075	60,142
Nov.	96,373	94,870	47,165	97,836	80,244
Dec.	93,736	99,468	52,992	87,105	84,711
Ave.	109,641	73,563	45,223	99,456	83,910

The output of pig iron in 1923 totaled 40,019,129 gross tons, a gain of 13,168,285 tons over the 26,850,844 tons of 1922. The 1923 output established a new high record, bettering the 39,019,123 tons of 1916 by 1,000,006 tons. Iron made during the last half of 1923 was 19,190,728 tons and 1,637,673 tons less than the 20,828,401 tons of the first half.

Furnaces active on Dec. 31 totaled 231, a gain of one over the 230 operating on Nov. 30 In December, five merchant furnaces were blown in and five blown out or banked. Of the nonmerchant class, five were blown in and four blown out, with the net gain of one stack.

Among the stacks blown in during December were: In Ohio: East Youngstown D, Youngstown Sheet & Tube Co.; Mattie, A. M. Byers Co. In Pennsylvania: One Bethlehem and one Cambria, Bethlehem Steel Co. In New York: Harriet Y, Wickwire Spencer Steel Corp.; Port Henry No. 2, Witherbee-Sherman Co. In Alabama: Vanderbilt No. 2, Woodward Iron Co.; City No. 1, Sloss-Sheffield Steel & Iron Co. In Tennessee: One furnace. Bon Air Coal & Iron Corp. In Colorado: Minnequa, Colorado Fuel & Iron Co.

Among the furnaces blown out were: In Ohio: Haselton No. 2, Republic Iron & Steel Co.; Lorain No. 3, National Tube Co. In Pennsylvania: One Eliza, Jones & Laughlin Steel Corp.; Monessen No. 2, Pittsburgh Steel Co.; Perry, Pickands, Mather & Co.; Delaware River, Delaware River Steel Co. In Alabama: Woodward No. 3, Woodward Iron Co. In Tennessee: LaFollette, LaFollette Coal & Iron Co. In Virginia: Buena Vista, Allegheny Ore & Iron Co.

DIVISIONS OF PRODUCTION

1922	Merchant	Non-merchant	Spiegel	Ferromanganese	Other ferro
Jan.	388,322	1,257,482	1,230	5,644	825
Feb.	355,455	1,274,725	4,930	3,618	872
March	390,643	1,645,265	2,095	11,604	1,102
April	375,814	1,694,347	4,211	14,998	828
May	410,404	1,898,944	4,902	15,432	405
June	423,672	1,938,783	4,817	18,254	854
July	441,752	1,961,278	7,176	18,873	1,887
Aug.	343,522	1,467,143	7,925	11,402	976
Sept.	353,604	1,670,404	4,235	10,681	934
Oct.	502,231	2,127,424	12,285	9,193	1,080
Nov.	603,348	2,242,762	4,192	13,232	961
Dec.	668,950	2,414,570	10,591	17,108	989
Total	5,257,717	21,593,127	68,589	150,039	11,713
1923					
Jan.	713,186	2,515,040	12,056	19,358	952
Feb.	708,901	2,285,017	3,657	21,410	759
March	767,219	2,756,376	13,832	20,730	236
April	795,558	2,750,750	7,440	20,810	670
May	909,726	2,958,760	9,533	19,568	892
June	899,102	2,768,766	18,184	19,717	874
July	900,496	2,784,181	12,876	26,493	776
Aug.	828,163	2,620,723	5,595	22,044	1,800
Sept.	734,754	2,382,772	4,478	23,206	1,860
Oct.	724,596	2,418,046	8,442	16,039	1,858
Nov.	726,686	2,164,505	16,783	14,839	3,259
Dec.	709,127	2,196,679	10,117	16,508	1,717
Total	9,417,514	30,601,615	122,993	240,722	15,653

DECEMBER PIG IRON

	No. of stacks	No. in blast last day of month Dec.	Nov.	Total tonnage made Merchant	Nonmerchant	Total Dec.	Nov.
Pennsylvania	150	87	89	162,793	825,896	988,689	1,002,356
Ohio	79	48	48	124,992	571,251	696,243	663,865
Alabama	42	22	21	102,505	109,755	212,260	215,477
Virginia	19	3	4	14,408	.....	14,408	16,819
New York	27	18	16	101,161	98,257	199,418	190,663
New Jersey	4	2	2	19,230	.....	19,230	18,509
Illinois	26	17	17	95,459	183,693	279,152	281,730
Colorado	5	2	1				
Indiana	16	14	14	32,912	281,159	314,071	306,872
Maryland	6	4	4				
Wisconsin	6	1	1				
Kentucky	7	1	1				
West Virginia	5	3	3	10,780	53,034	63,814	73,525
Tennessee	14	2	2				
Washington	1	0	0				
Georgia	2	0	0				
Texas	1	0	0				
Minnesota	3	3	3	32,823	57,356	90,179	86,494
Michigan	4	4	4				
Missouri	1	0	0				
Spiegel and ferro—all states	..	..	..	12,064	16,278	28,342	34,881
Totals	418	231	230	709,127	2,196,679	2,905,806	2,891,191

Arbitration Bar

Problems Will Be Studied by A F. A. and A. S. T. M. Committees

In an account just made public of a meeting held Dec. 15 at Detroit of the gray iron committee of the American Foundrymen's association and members of the A-3 committee on gray iron of the American Society for Testing Materials, progress is recorded of the first activity in this country resulting from the action taken at the recent Paris Foundrymen's congress in the interest of a standard international arbitration test bar for gray iron. H. B. Swan, Cadillac Motor Co., Detroit; R. S. MacPherran, Allis- Chalmers Mfg. Co., Milwaukee; Willard Rother, Buffalo Foundry & Machine Co., Buffalo; J. K. Stoddard, Detroit Testing Laboratory, Detroit, and E. J. Lowry, Hickman, Williams & Co., Chicago were the members of the American Foundrymen's association committee present. Walter Wood, R. A. Wood & Co., Philadelphia; Dr. Richard Moldenke, Watchung, N. J., and H. E. Diller, *The Foundry*, Cleveland, members of the A. S. T. M. committee, also attended.

Correspondence between officers of the two associations was read in which it was shown that H. B. Swan had been elected to the American vacancy on the international arbitration test bar committee which is composed of eight nations: America, England, France, Spain, Italy, Belgium, Switzerland and Czecho-Slovakia. Emile Ramas, Paris, is president and E. C. Ronceray, Paris, is secretary.

A resolution was adopted authorizing the committee to purchase a Fremont Portevin testing machine to be delivered to members of the committee to enable them to examine their castings for strength and to compare the results obtained to the strength of the individually cast test bars. It also was decided to conduct experimental work on round test bars. Test bars of 1.2, 1.3, 1.4 and 1.5 inches diameter are to be considered. The bars shall be cast on end, one to a mold, 21 inches long and shall be tested on 18-inch centers. The bars shall be similar in design to the present A. S. T. M. bar with the exception of the dimensions noted above. The molds shall be made either of dry sand or cores. The test bars shall not be tumbled or machined and in case the bars are shipped to a distant point for testing they shall be packed in sawdust or similar material. At least 12 bars shall be cast from the heat and from the same ladle. Six of the bars shall be tested by the maker and the remaining six are to be sent to the committee for supplementary tests. The analyses of the sets of test bars shall be sent to the committee along with results of the individual foundry strength tests. The test bars are to be numbered from 1 to 12 and in such a way that their identity may not be destroyed.

In order to gain knowledge of the English method of testing, 12 test bars molded singly, on end, in dry sand or core molds shall be made by individual foundries. The bars are to be 0.875 inch in diameter and 15 inches long; 1.2 inches in diameter and 21 inches long; and 2.2 inches in diameter and 21 inches long. The bars are to be tested in accordance with the plan outlined in the preceding paragraph. The 0.875-inch diameter bars shall represent castings up to ¾ inch in section; the 1.2-inch bars, castings up to 2 inches in section and the 2.2-inch bar castings above 2 inches in section.

Peerless Co. Reorganized

An executive committee of three men has been appointed to manage the Peerless Truck & Motor Co., Cleveland, following the acceptance of resignation proffered by R. H. Collins as president and general manager and W. H. Collins as vice president and director. The committee is composed of Fred R. White, chairman, C. E. Sullivan and H. A. Tremaine. D. A Burke, vice president and director of sales, was elected vice president and general manager. H. C. Robinson, vice president of the Guardian Savings & Trust Co., Cleveland, was elected director to fill the place vacated by W. H. Collins. The company was reported as on a sound financial basis with total sales for the first 11 months of 1923 ahead of those for all of 1922.

Place Large Crane Order

One of the largest single orders ever placed for electric traveling lumber handling cranes recently was awarded to the Pawling & Harnischfeger Co., Milwaukee, Wis., by the Long Bell Lumber Co., for use at the mill at Long View, Wash. Twenty-one cranes are included in the order as well as 7000 feet of special monorail track with seven two-way switches. An entire freight train will be required to handle the equipment. The entire equipment will handle the outgoing shipments of lumber and timber both for domestic and export trade.

Books Canadian Rails

The British Empire Steel Corp. officially announces that it has received an order for 56,000 tons of steel rails from the Canadian National Railways for March delivery.

Foreign Trade

In Iron ahd Steel Products in 1923 Slightly Above Preceding Year

Iron and steel trade with foreign countries during 1923 was slightly above the volume of that in the preceding year. Exports of iron and steel products and ores from the United States during the past year based on reports of the department of commerce for the first 11 months, are estimated at 2,025,000 tons, as compared with 2,000,061 tons for 1922. Heavier shipments during November and December brought the year to its higher total, the first few months of 1923 recording smaller tonnages for nearly all items.

Imports for 1923, based on the total for the first 11 months, are estimated at 732,722 tons as compared with 723,914 tons in 1922. Starting in January 1923 with 119,955 tons imported, the receipts of iron and steel products and ores dropped to 67,682 tons in February, rose to 106,050 tons in March and then consistently declined until November registered the low mark of the past twelve months with 26,365 tons.

Pig iron imports in 1923 totaled approximately 365,000 tons, os slightly over half of the total receipts. The high mark in this material was January when 83,935 tons was imported. After the middle of the year shipments of pig iron received fell off considerably, with but 9349 tons being imported in October and 9299 tons in November. Iron and steel scrap furnished the only other item imported in large quantities in 1923. Approximately 161,000 tons of this material was received. Imports in the last half of the year declined sharply from the levels of the first half. October imports were the lowest, with but 3046 tons received.

Manganese ore imports fell off to less than half of the 1922 total. Approximately 205,000 tons was received in the year just ended, as compared with 327,748 tons in 1922 and 401,354 tons in 1921.

Exports of steel rails, with a total of approximately 267,000 tons shipped in 1923, were the largest of any product on the list. Galvanized sheets exported totaled about 120,000 tons while black steel sheets aggregated about 110,000 tons. Fabricated structural shapes totaled about 80,000 tons while plain structural material exports amounted to approximately 121,000 tons for the year.

Exports of ferrosilicon, ferromanganese and spiegeleisen more than doubled those of 1922.

Iron and Steel Prices

SCRAP PRICES, PAGE 132, WAREHOUSE PAGE 128, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 130

Pig Iron

Prices per gross ton

Bessemer, valley	$22.50 to 23.00
Bessemer, Pittsburgh,	24.27 to 25.77
Basic, valley	20.00 to 21.00
Basic, Pittsburgh	21.77 to 22.77
Basic, Buffalo	22.50
Basic, del., eastern Pa.	23.25 to 23.75
Malleable, valley	20.00 to 22.50
Malleable, Pittsburgh	21.77 to 24.77
Malleable, Chicago	23.50
Malleable, Buffalo	22.00
Malleable, del., eastern Pa.	24.00 to 25.00

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	24.76 to 25.26
No. 1X, Buffalo	24.00
No. 2 foundry, valley	22.00 to 23.00
No. 2 foundry, Pittsburgh	23.77 to 24.77
No. 2 foundry, Buffalo	22.50 to 23.00
No. 2 foundry, Chicago	23.50
No. 2 foundry, Granite City	24.00 to 25.00
No. 2 foundry, Ironton furnace	22.50
No. 2 foundry, Cleveland, del.	23.00 to 23.50
No. 2 foundry, del., Phila.	23.76 to 24.26
No. 2 foundry, N. J. tidewater	24.13 to 24.76
No. 2X, eastern del., Phila.	24.26 to 24.76
No. 2X, east. N. J. tidewater	24.63 to 25.26
No. 2X, eastern del., Boston	26.65 to 27.65
No. 2X foundry, Buffalo fur.	23.00 to 23.50
No. 2X, Buffalo, del. Boston	26.92 to 27.92
No. 2 southern, Birmingham	21.00 to 22.00
No. 2 southern, Cincinnati	25.05
No. 2 southern, Chicago	27.01
No. 2 southern, Philadelphia	28.80
No. 2 southern, Cleveland	27.01
No. 2 southern, Boston (rail and water	27.91 to 28.91
No. 2 southern, St. Louis	26.17
No. 2X, Virginia furnace	24.50
No. 2X, Virginia, Phila.	29.77
No. 2X, Virginia, Jersey City	30.04
No. 2X, Virginia, Boston	30.92
Gray forge, eastern Pa.	23.25 to 23.50
Gray forge, val. del., Pitts.	23.27
Low phos., standard, valley	29.00
Low phos., standard, Phila.	29.50 to 30.00
Low phos., Lebanon, furnace	28.00
Charcoal, Birmingham	32.00 to 33.00
Charcoal, Superior, Chicago	29.04

Silvery Iron

Jackson County, Ohio, furnace

7 to 8 per cent	31.00
8 to 9 per cent	32.50
9 to 10 per cent	34.50
10 to 11 per cent	36.50
11 to 12 per cent	39.00
12 per cent	41.50

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	41.50
11 to 12 per cent	44.00
12 to 13 per cent	46.50

Ferroalloys

†Ferromanganese 78 to 82 per cent, tidewater, or furnace first hand and resale	$109.00 to 110.00
Ferromanganese, delivered, Pittsburgh	113.79 to 114.79
Spiegeleisen 19 to 21 per cent furnace or tidewater	38.00 to 39.00
Ferrosilicon, 50 per cent contract freight allowed	75.00
Ferrotungsten standard, cents per pound contained	85.00 to 90.00
Ferrochrome, 60 to 70 chromium, 6 to 8 carbon, cents per pound contained, delivered	10.00
Imported ferrochrome, 4 to 6 per cent carbon	nominal
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Prices per net ton

Connellsville furnace	$3.85 to 4.40
Connellsville foundry	4.75 to 6.00
New River foundry	11.00 to 12.00
Wise county furnace	5.00 to 5.75
Wise county foundry	5.75 to 7.00
Alabama furnace	5.00 to 6.00
Alabama foundry	5.50 to 6.50

By-Product

Foundry, Newark, N. J., del.	$10.91
Foundry, Chicago, ovens	12.50
Foundry, Boston, delivered	12.50
Foundry, St. Louis	13.00 to 13.50
Foundry, Granite City, Ill.	13.00 to 13.50
Foundry, Alabama	5.00 to 6.00

Semifinished Material

Prices per gross ton

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$40.00
Open-hearth, Youngstown	40.00
Open-hearth, Philadelphia	45.17
Bessemer, Pittsburgh	40.00
Bessemer, Youngstown	40.00
Forging, Pittsburgh	45.00
Forging, Philadelphia	50.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$40.00
Youngstown	40.00

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh	$51.00

Standard extras, $2.50 per ton over ¾-inch; $5 for screw stock; $15 for acid wire rods. Carbon extras, $3 for 0.20 to 0.40; $5 for 0.41 to 0.55; $7.50 for 0.56 to 0.75; $10 over 0.75.

SKELP

Grooved skelp, Pittsburgh	2.35c to 2.40c
Universal skelp, Pittsburgh	2.35c to 2.40c
Sheared skelp, Pittsburgh	2.35c to 2.40c

Shapes, Plates and Bars

Prices per pound

Structural shapes, Pittsburgh	2.50c
Structural shapes, Phila.	2.67c to 2.82c
Structural shapes, New York	2.69c to 2.84c
Structural shapes, Chicago	2.60c
Tank plates, Pittsburgh	2.50c
Tank plates, Philadelphia	2.67c to 2.82c
Tank plates, New York	2.69c to 2.84c
Tank plates, Chicago	2.60c
Bars, soft steel, Pittsburgh	2.40c
Bars, soft steel, Philadelphia	2.67c to 2.72c
Bars, soft steel, New York	2.69c to 2.74c
Bars, soft steel, Chicago	2.50c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c
Bars, rail steel, mill	2.10c to 2.20c
Reinforcing bars, billet, Pitts.	2.40c
Bar iron, common, Phila.	2.62c to 2.67c
Bar iron, common, New York	2.64c to 2.69c
Bar iron, common, Chicago	2.40c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Prices per pound

Hoops, Pittsburgh, under 5 in.	3.00c
Hoops, Pittsburgh, 20 gage, under 1 in.	3.35c to 3.50c
Bands, Pittsburgh	3.00c
Cold finished steel bars, Pittsburgh base	3.00c
Steel shafting, Pittsburgh	3.00c
Cotton ties, bundle 45 lb. Pittsburgh	$1.67

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 32.50
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.00c to 3.15c
Spikes, small railroad, Pitts.	3.50c
Spikes, boat and barge, Pitts.	3.50c
Spikes, railroad, Chicago	3.10c
Track bolts, Pitts. Standard.	4.00c
Track bolts, Pitts., small	4.75c to 5.00c
Track bolts, Chicago	4.10c
Tie plates, Pittsburgh	2.55c
Tie plates, Chicago	2.60c

Spike, tie plate and truck bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Prices per pound

Wire nails, Pittsburgh	3.00c
Galv'd nails, 1-inch and over	5.25c
Plain wire, Pittsburgh	2.75c
Annealed wire, Pittsburgh	2.90c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c
Barbed wire, painted, Pitts.	3.45c
Barbed wire, galv., Pitts.	3.80c
Polished staples, Pittsburgh	3.45c
Galvanized staples, Pittsburgh	3.80c
Coated nails, count keg, Pittsburgh	2.70c
Woven wire fencing (retailers)	65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Prices per pound

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburg stamping quality	3.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.00c

Sheets

SHEET MILL BLACK

Prices per pound

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.07c to 4.17c
No. 28, open-hearth, Chicago.	4.09c to 4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c

GALVANIZED

No. 28, open-hearth, Pitts.	4.90c to 5.00c
No. 28, bessemer, Pittsburgh	4.90c to 5.00c
No. 28, open-hearth, Phila.	5.22c to 5.32c
No. 28, open-hearth, Chicago.	5.19c to 5.34c

BLUE ANNEALED

No. 10, open hearth, Pitts.	3.00c
No. 10, bessemer, Pittsburgh	3.00c
No. 10, open-hearth, Phila.	3.22c to 3.32c
No. 10, open-hearth, Chicago.	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c

Tin Plate

Prices per 100-pound box

Tin plate, coke base, Pitts.	$5.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	62	50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Prices per net ton

Class B Pipe

Four-inch, Chicago	$59.20 to 60.20
Six-inch and over, Chicago	55.20 to 56.20
Three-inch, Birmingham	56.00 to 57.00
Four-inch, Birmingham	49.00 to 50.00
Six-inch and over, Birmingham	46.00 to 48.00
Four-inch, New York	65.60 to 66.60
Six-inch and over, New York	60.60 to 61.60

Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $5 higher than Class B.

New Year Brings Out Business

Steel Buying Continues To Spread—Southern Pacific Places Large Car Order But Some Other Roads Hold Off—Fall of Pig Iron Production Is Checked In December—Shipments on the Increase

PROSPECTS for the future of the iron and steel industry continue to improve as the beginning of the new year finds general buying sustained in larger volume. Buyers are showing a growing tendency to provide for their estimated first quarter requirements and are doing it with greater confidence in prevailing prices and in their ability to absorb this material in their operations. While certain industries such as the automotive plants have taken the initiative in buying steel for 1924, the covering movement is spreading out to embrace practically all groups of miscellaneous consumers. At Youngstown fully 75,000 tons of sheet bars have been sold at the full $42.50 price.

IRON TRADE REVIEW composite of fourteen leading iron and steel products begins the year at $43.06, a slight advance in the final week. One year ago it stood at $40.67.

The Southern Pacific in the closing days of the year finally distributed its order for 6550 cars making car awards in December the largest since March. Not all roads, however, are willing to buy at present prices. The Reading withdrew its inquiry for 1000 cars though it was quoted 2.35c steel it is understood. Building awards are good, the leading item being 6100 tons for the Ford Motor Co. assembling plant at St. Paul.

After six months, the shrinkage of pig iron production seemed checked in December. The total for that month was 2,905,806 tons and the daily average 93,736 tons, compared with 2,891,191 tons and 96,373 tons respectively in November. Active furnaces gained 1, totaling 231. Production of coke iron for the year was 40,020,000 tons and including charcoal, 40,260,000 tons, the greatest in history.

At Chicago December shipments of pig iron were the heaviest of the year. New buying of iron in all districts still reflects the holiday quietness.

Pig Iron Stationary, Awaiting Buying Movement

PIG iron producers are convinced that a large tonnage remains to be purchased for the first quarter, and a rapid increase in the volume of business is expected in January. Prices generally remain stationary, though not uniformly firm. A strong feature of the situation is that melters are requesting earlier shipment of their first quarter iron than they had anticipated; shipments have continued in good volume, despite the letdown in new buying. Chicago makers report their shipments in December were the heaviest of the year. The customary holiday quiet prevails in the current market.

The usual quotation on No. 2 foundry iron is $22.50, valley. Another valley merchant furnace increased its asking price to that level during the week. Some iron still is available at $22. The market for basic iron is devoid of feature, and though the customary quotation is $21, valley, one or two makers are willing to accept $20 for large tonnage orders.

The ruling price for northern foundry and malleable quoted at Chicago is $23.50, furnace. Charcoal iron remains at $29.04, delivered Chicago. A Buffalo maker reports it is getting $23 to $25 for foundry. On its malleable up to 2.25 silicon it has a price of $23, and for 2.25 to 2.75 silicon, $23.50 Another Buffalo maker's foundry range is $23 to $24. Boston reports there is less firmness in Pennsylvania and New York producing centers. Several sales of No. 2X eastern Pennsylvania and New York iron (2.25 to 2.75 silicon) have been closed at $23, furnace, or $26.65 delivered. Several sales have been made at $22, Buffalo. From New York and Philadelphia it is reported that sales are made at $23, base furnace, plus 50-cent silicon differentials. Southern iron is $21 to $22, Birmingham.

No Lull in Shape Demand

STRUCTURAL shape buying continues undiminished despite holiday season. Record building programs planned for spring construction forecast heavier demand. Estimated building for Chicago and vicinity in 1924 is valued at $100,000,000 exclusive of houses and small structures. Prices are firmer in the East. Exceptional tonnages still go at 2.40c, Pittsburgh, by smaller eastern mills. The 6100 tons of shapes for the Ford Motor Co. assembling plant at St. Paul will be fabricated by the Minneapolis Steel & Machinery Co. and the St. Paul Foundry Co., the plain material being furnished by Illinois Steel Co. Other large awards include 1720 tons for Claybourne avenue landing, New Orleans, to Lukens Steel Co., 1700 tons for Public Service Co. of Northern Illinois to Riter-Conley Co. and 2000 tons for Baltimore & Ohio railroad bridge, at Parkersburg, W. Va., awarded to the Fort Pitt Bridge Works.

Car Orders Again Placed

CAR BUYING activity is increasing. Southern Pacific has placed 6550 cars, 2975 to the Standard Steel Car Co. 1200 to the Ralston Steel Car Co., 1075 to its own shops, 805 to the General American Car Co., and 500 to the Pullman Co. The Fruit Growers Express is inquiring for 1000 underframes and Western Fruit Express for 1000 refrigerators. New York Central awarded 2000 freight car conversions and St. Louis-Southwestern 1000 box cars. The leading independent rail maker at Chicago has taken 25,000 tons additional and is booked full for first half. Chilean State railways bought 10,000 tons of rails from United States Steel Products Co. Track accessory buying is heavy. Northern Pacific is in the market for 15,000 kegs of spikes.

Plate Sales Moderate

ALTHOUGH no outstanding tonnages of plates have been booked in the past week, a fair volume has come to makers from miscellaneous sources. At Chicago plates for car work are more in demand as railroad

programs take definite form. The price is firm at 2.60c, Chicago. Illinois Steel Co. has received a contract for 15,000 tons of steel from the American Car & Foundry Co. and 8000 tons of steel from the Western Steel Car Co. for new cars for the Wabash railroad. The usual price in the East on attractive tonnage is 2.40c, base Pittsburgh, with 2.35c occasionally. Bids on 2000 tons of plates, for a pipe line in the Lake Youngs development, state of Washington, have been rejected owing to a technicality. It is reported that as low as 2.85c, Seattle dock, was offered, including customary extras.

Bars Hold Steady

SOFT steel bars are steady at 2.40c, Pittsburgh, and 2.50c, Chicago, with no signs of weakness. Buying is fair for current needs and first quarter requirements are being booked. A western mill finds December tonnage and specifications double November. Iron bars are in light demand at 3.25c to 5.00c, Pittsburgh, and 2.40c, Chicago. Rail steel bar demand is increasing, fence post manufacturers and others taking more interest in the market. The quotation is 2.30c at Chicago. Specifications for hot and cold-rolled strip steels are pleasing in total tonnage and prices are firm at 3.00c, Pittsburgh, for hot and 5.00c, Pittsburgh, for cold-rolled. Cold drawn bars are in demand, especially from automotive manufacturers, whose needs are heavy, the General Motors Corp. taking 1100 to 1500 tons for its Muncie, Ind., plant for first quarter. The quotation of 3.00c, Pittsburgh, is firm and sellers are not selling freely at that figure. Bolt, nut and rivet orders are increasing and slight concessions have been made to large users, though the market is firm for most part. Hoop and band bookings are satisfactory but larger buying is expected shortly. The market is firm at 3.00c to 3.15c, Pittsburgh, with higher prices for light gage, narrow hoops. Heavier inquiries are coming out for reinforcing bars but awards are mostly in small lots. Prices are firm with less shading in rail steel.

Coke Buyers Waiting

CONDITIONS in the coke market generally remain unsettled; demand is light and prices in some districts show further weakness. One or two Connellsville makers have accepted first quarter business from blast furnaces at $3.75, ovens, while others quote $4.40 as minimum. A few first quarter and first half contracts for foundry coke have been written in the week at prices ranging from $4.75 to $7, though $5 to $6 represents the usual spread. Output for the week ended Dec. 22 reached 195,420 tons, compared with 183,060 tons in the preceding week, according to the *Connellsville Courier;* due largely to increased operations by the H. C. Frick Coke Co. From Boston it is reported the December price of $12.50 on New England by-product foundry coke probably will hold through January.

Wire Demand Heavy

SCATTERED buying of wire products meets expectations for the season and first quarter prospects are bright. Specifications are in good volume. Consumption, especially of nails promises to exceed that of the closing year. Mill stocks are lacking, particularly of small nails. Prices are firm at 2.75c, Pittsburgh, for plain wire and 3.00c, Pittsburgh, for nails. At Pittsburgh operations are at 70 per cent. At Chicago demand is increasing, with much January shipment booked. Order books are filing well.

Tin Plate Users Covered

AS REGARDS more business for first quarter, and in some cases the first half, the tin plate industry has practically a closed door. Some suspensions now unexpected later may leave room for additional business, but this is problematical. A few inquiries appear from consumers who believe they have not protected themselves to the amount that later will be necessary. The price is firm at $5.50 per base box, base Pittsburgh.

Sheet Bookings Larger

DEVELOPMENTS in the sheet market are encouraging and point to a steadily improving situation. At Chicago, practically all the large makers are substantially booked for the first quarter. Bookings by valley mills and in the East are showing much improvement. Pittsburgh reports that more orders are being placed at the full market prices, 3.00c, 3.85c, 5.00c and 5.35c, base Pittsburgh, for blue annealed, black, galvanized and full finished grades, respectively.

Mills representing more than 65 per cent of full finished automobile sheet producing capacity are maintaining the price of 5.35c, and buyers are closing at this figure though claiming to have offers at $3 to $5 per ton less.

With the coming out of large tonnages for the first quarter in the eastern territory, lower prices have been named by some makers. Several have quoted 3.75c, base Pittsburgh, on black, and some smaller interests, 3.65c. Only a few mills adhere to 3.85c on black. Blue annealed sheets are 3.00c, base Pittsburgh, with 2.90c in exceptional instances. Galvanized generally is 5.00c; some business going at 4.90c. Chicago prices are firm at 3.00c, 3.85c and 5.00c, Pittsburgh, on blue, black and galvanized.

Nonferrous Market Dull

QUIET trading rules nonferrous metal markets. Prices show little change except that tin dropped to 46.62½c Friday for spot and copper was easy at 13c. The latter was a little more active for domestic use, after a period of dullness, but the export market was dull. Lead continues to be the strongest metal with supplies short for early shipment and the price 7.75c, St. Louis, and 8c New York. Zinc is slightly firmer at 6.27½c, St. Louis for prompt metal. Aluminum is strong and supplies for the open market are limited. Prices are 26c to 28c for virgin, and a little higher has been asked in some instances.

Pipe Buying Holds Up

PIPE mills are well booked in butt-weld sizes but lapweld business is lacking. Jobbers are active purchasers of tubular products. Heavier buying is expected soon against spring demand. Oil country goods buying also is expected to increase. Operations are on about 70 to 75 per cent basis. Prices are unchanged.

Utilities continue to buy heavy tonnages of cast iron pipe. Municipal demand, featureless for the past few months is expected to revive after administration changes in January. The leading maker booked 12,000 tons from Detroit City Gas Co. and about 4000 tons from an Indianapolis utility. Denver placed 6500 tons and Public Service Co. of Northern Illinois, 2800 tons with the same company. Omaha placed 3000 tons with the National Cast Iron Pipe Co. Heavy inquiries are fewer following the holiday season. Vernon, Cal., is in market

for 2625 tons, and Sacramento for 1164 tons. Prices are firmer on small grades and are unchanged on larger sizes.

Semifinished Is Quiet

SEASONAL quietness still is apparent in the market for semifinished material, though the prospects seem more secure for a buying movement of considerable scope in the near future. Prices generally are firm. Many consumers have obtained protection on their first quarter requirements. Some contracts were closed in the Pittsburgh district in the week on the basis of $40, Pittsburgh or Youngstown, for 4 x 4-inch rerolling billets and $42.50 for smaller size. In certain instances the differential was waived. Sheet bars are strong at $42.50, Pittsburgh or Youngstown, and contracts carrying that price have been fairly numerous. Sales of 1500 to 2000 tons of rerolling and forging billets have been made in the Philadelphia territory at $40, base Pittsburgh, for rerolling and $45 for forging quality. Several customers have covered their requirements for wire rods, which are quoted at $51, Pittsburgh. Deliveries on skelp orders are being made at as high as 2.50c, base Pittsburgh, for auto wheel and tube skelp. Other skelp is available at 2.35c and 2.40c.

Little Change in Scrap

IRON and steel scrap begins the year with moderate trading and expectation of heavier sales in January, as consumers' stocks are low. Steel grades are moving better than others and some cast is also being taken. Prices have changed but little and there are movements both ways. At Pittsburgh some steel is being bought and prices are about 50 cents higher. At New York current buying is light but quotations are 25 to 50 cents higher. Chicago sees little buying and it is established the rumor of large buying for Gary was unfounded. Prices are 50 cents lower there. Better buying is noted at New England points and heavy shipments of steel are being made to Pennsylvania melters. Consumers in the Philadelphia district are lowering their bids and there are few sales. Consumers' stocks are low. At Cincinnati prices are 50 cents higher on practically all grades.

Machinery Buying Light

BUSINESS in machine tools and shop equipment has been light during the week due to holidays and inventory period. Heavy buying was confined to the order of the Southern railroad for 25 to 30 machines, 15 being awarded to an eastern builder, and the purchase of 20 to 25 tools by the General Electric Co. for the Schenectady plant. Other industrial buying includes the Dominion Bridge Co.; the Elliott Co., Pittsburgh, Pullman Co., Chicago and Worthington Pump & Machinery Corp., Harrison, N. J. Immediate action is scheduled on the list for the Standard Sanitary Mfg. Co., Baltimore, while the Chicago board of education is expected to close soon. Inquiries are being received at Pittsburgh from a large independent steel interest which last week decided on its expansion program for early 1924. Business for December, however, has been very satisfactory, and at present inquiries are good. Crane buying is slack, inquiries light and only a few orders are reported.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Jan. 2, 1924	Dec., 1923	Oct., 1923	Jan., 1923
PIG IRON				
Bessemer, valley del., Pitts.	$24.27	24.17	27.27	29.27
Basic, valley	20.00	20.50	23.75	25.90
Basic, eastern del., eastern Pa.	23.50	23.30	24.00	27.70
*No. 2 foundry, del. Pitts.	23.77	23.77	25.17	28.77
*No. 2 foundry, Chicago	23.50	23.00	25.60	28.80
*Southern No. 2, Birmingham	21.00	20.75	20.20	23.30
*Southern Ohio, No. 2, Ironton	22.50	22.50	23.90	27.90
**No. 2X, Virginia furnace	24.50	24.75	25.00	27.50
**No. 2X, eastern del., Phila.	24.26	24.26	24.51	29.56
Malleable, valley	21.00	21.50	23.25	27.75
Malleable, Chicago	23.50	23.00	25.60	28.80
Lake Superior charcoal, Chicago	29.04	28.80	30.05	33.15
Gray forge, val. del. Pittsburgh	23.27	23.27	24.52	27.77
Ferromanganese, del., Pitts.	113.79	113.79	112.04	109.79
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh	42.50	42.50	42.50	37.50
Sheet bars, open-hearth, Pitts.	42.50	42.50	42.50	37.50
Billets, bessemer, Pittsburgh	40.00	40.35	41.50	37.50
Billets, open-hearth, Pittsburgh	40.00	40.35	41.50	37.50
FINISHED MATERIAL				
Steel bars, Pittsburgh	2.40	2.40	2.40	2.00
Steel bars, Chicago	2.50	2.50	2.50	2.08
Steel bars, Philadelphia	2.72	2.72	2.72	2.385

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

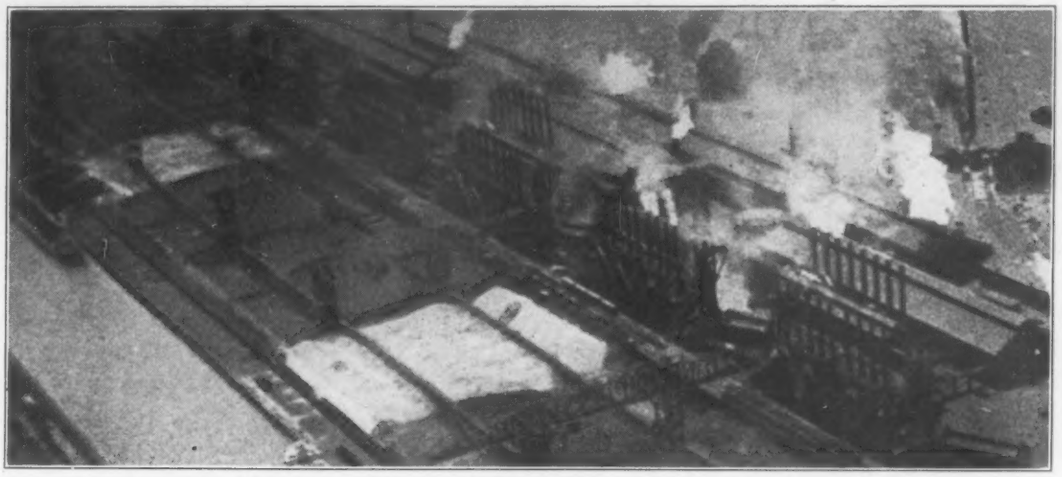
	Jan. 2, 1924	Dec., 1923	Oct., 1923	Jan., 1923
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.62	2.62	2.62	2.365
Iron bars, Chicago mills	2.40	2.40	2.40	2.35
Beams, Pittsburgh	2.50	2.50	2.50	2.05
Beams, Philadelphia	2.72	2.72	2.72	2.385
Beams, Chicago	2.60	2.60	2.60	2.18
Tank plates, Pittsburgh	2.50	2.50	2.50	2.05
Tank plates, Philadelphia	2.72	2.72	2.72	2.385
Tank plates, Chicago	2.60	2.60	2.60	2.18
Sheets, blk., No. 28, Pittsburgh	3.75	3.75	3.75	3.35
Sheets, blue anl., No. 10, Pitts.	3.00	2.95	3.00	2.50
Sheets, galv., No. 28, Pittsburgh	4.90	4.90	5.00	4.35
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
COKE				
Connellsville furnace	3.85	3.85	3.85	8.25
Connellsville foundry, ovens	4.75	4.80	4.80	9.00
OLD MATERIAL				
Heavy melting steel, Pittsburgh	19.00	18.35	16.10	21.65
Heavy melting steel, eastern Pa.	16.75	16.90	15.50	19.70
Heavy melting steel, Chicago	17.00	16.50	14.50	18.70
No. 1 wrought, eastern Pa.	19.00	19.00	18.00	22.25
No. 1 wrought, Chicago	17.50	16.50	15.30	19.40
Rails for rolling, Chicago	17.50	17.30	16.25	20.55

Composite Market Average

Representing the Combined Average Prices Per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago.

Jan. 2, 1924	Dec. 26, 1923	Dec., 1923	Oct., 1923	Jan., 1923	Jan., 1914
$43.06	$43.02	$43.02	$43.84	$41.17	$23.03

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe



Aerial View of the Blast Furnace Group of the United States Steel Corp. at Gary, Ind.

Domestic Market Reviews for 1923

Pig Iron	Ferroalloys
Coke	Structural Shapes
Semifinished Steel	Rails
Tin Plate	Sheets
Cast Iron Pipe	Plates
Merchant Bars	Nonferrous Metals
Welded Pipe	Old Material
Wire Products	Coal By-Products

Prepared by Iron Trade Review Staff Representatives

W. H. Lloyd, Pittsburgh
E. C. Boehringer, Chicago
G. H. Manlove, Chicago
E. C. Kreutzberg, New York
G. F. Creveling, New York
B. K. Price, New York
H. R. Simonds, Boston

Normal Business Returns In 1923

Steel Demand Reaches Highest Point in History with Railroads, Building Work and Automotive Industry the Principal Contributing Factors—Future Prospects for Steel Are Bright—Over-production Causes Uncertainty in Pig Iron

BY C. J. STARK
Editor, Iron Trade Review

NORMAL conditions of business more closely were approached by the iron and steel industry in 1923 than during any year since the war. The twelve-month period just past may be said to have carried to maturity the process of recovery of a free flow of trade, unmixed with the inflation or deflation of war and their after-effects, for which the preparations and foundations were laid in 1922 following the great fluctuations in reverse of 1921 and 1920. Demands in 1923 were shaped more in accordance with sound present requirements or logical future development than by forces arising from the unbalanced and unsettled conditions of the postwar period. Apparently from the evidences of the past year, the readjustment to new conditions necessitated by the excesses and abnormal stimulation of the war period is well on the road to completion in American industry.

To all tests, domestic consumption of steel in 1923 was the largest the country has ever known. No other peace year approached 1923 in its volume of output of steel. Considering the liquidated stocks in users' hands the previous year and the fact that conservatism in making new commitments was so marked during the last half, it is believed any accumulation of unabsorbed tonnage was of an exceedingly modest total. What is true in steel, however, is not equally applicable to pig iron for stocks on furnace banks rose in the last half to the largest total known in many years and still remain in large part. This unfavorable situation doubtless is explained by the margin by which pig iron output exceeded that of all other years and plainly reflects a case of over-production. In no way, however, does this undisturbed tonnage detract from the favorable aspect of the large volume of steel production and the corresponding scope of consumption which it signifies because over-production in the case of the former is not apparent and furthermore the steel companies themselves were partially responsible for bringing this condition about through their increased offering of iron on the market.

Records for Output

Production of iron and steel in 1923 established new high marks for any peace year. In pig iron a new record for the country for all time was scored with a production of approximately 40,260,000 tons. This exceeds by about 800,000 tons the previous high point of 1916. The showing in steel was only slightly less impressive. The estimated total output of ingots and castings was approximately 44,800,000 tons. This compares with the record of 45,067,000 tons in 1917. Consumption of Lake Superior iron ore in the 11 months from Jan. 1 to Dec. 1 was the greatest ever known totaling 57,757,000 tons. Shipments for the year, however, were exceeded by those of 1916, 1917 and 1918 and were approximately 61,000,000 tons.

Outlook Is Bright

Beginning with promise, the year of 1923 is ended with good prospects again in the ascendency. Summed up, the heavy demand for steel the past year, in large part was due to the expanded and sustained activity in railroad replacements and additions, in building work, in automotive production and in the oil, water and gas industry. These requirements in total accounted for practically two-thirds of the year's output of the mills. The fact that for all of these sources, the present scope of demand is continuing at a high rate with every indication of being maintained if not further enlarged, makes for favorable prospects in the steel market for the first half of 1924. This view of the future has been taking hold of the industry with increasing force, especially in the concluding months of 1923. As the year closed, confidence was stronger than in months.

Prices Move Apart

Prices in the year moved with marked dissimilarity in pig iron and steel. Under the impetus of liberal buying extending through the first four months of the year both pig iron and steel rose steadily and reached their high level in April and May. From that point forward buying tapered off and the remainder of the year was a contest of endurance over prices between buyers and sellers. With the sharp falling off in sales in April and May pig iron quickly began to droop. The market by stages slipped lower and lower until in mid-November when active buying was resumed it had declined from $8 to $10 per ton in seven months. One factor which undoubtedly contributed to this slump of prices was the larger offering of iron in the market by steelworks furnaces. Competition from this source in 1923 was greater than it had been in years. Heavy importation of foreign iron also was a factor. In contrast with pig iron, steel prices after reaching their crest in May showed strong resistance to any downward tendency during the remainder of the year. While concessions were sought and obtained by buyers

from time to time in numerous lines these usually were developed from the smaller producers. On the major lines and with the larger makers the market on finished steel held remarkably firm considering the lapse of new buying. The uncertainty over prices kept buying in check and general reductions seemed probable in the last quarter until buying for 1923 delivery reasserted itself in volume in December. It then appeared that the producers had won in the test over prices.

The elimination of the 12-hour day in the steel plants which became effective starting in August undoubtedly was a strong factor in holding steel prices steady during the period of reduced buying, especially in the final quarter. It is commonly estimated the shortened workday has increased steel production costs $3 to $4 per ton.

Exports Are Moderate

Foreign demand contributed only in a small way to bring about the large production of steel the past year and this further accents the unusual volume of domestic consumption. Exports totaled approximately 2,000,000 tons representing about 6 per cent of the entire output of finished steel. Imports, however, were large totaling approximately 740,000 tons but were less than in 1922 when they touched the highest mark since 1903. Of the 1923 total, pig iron which came largely from Great Britain represented about 365,000 tons.

The price course of the whole market in the year is accurately portrayed by IRON TRADE REVIEW composite of 14 leading iron and steel products. In December, 1922 this index stood at $40.53. In January it rose to $41.17, in February to $42.61, in March to $45.31, in April to $47.01 and in May to $47.52 which marked the peak of the 12 months. From that point a steady descent is shown. The composite in June was $46.46, in July $45.39, in August $44.87, in September $44.64, in October $43.04 and in November $42.81. In December the trend again turned upward, the average of the final month being $43.02. At present, the general level of prices as registered by the composite is 6.1 per cent above a year ago.

Railroads Go Forward

Throughout the year the railroads carried forward their tremendous program of replacements and betterments upon which they had embarked in the latter part of 1922. According to official reports from producers embracing a larger part of the steel capacity of the country the railroads directly and indirectly absorbed about one-third of the total mill output the past year or about 9,500,000 tons. This was made up principally of rails and track work, cars and locomotives, bridges and buildings and a wide variety of miscellaneous needs. The demand for rails, while large in 1923, according to present indications promises to be exceeded in 1924. Active buying of rails on a large scale has been carried on by the railroads all through the last half until at present mill capacity is booked to mid-year. For Chicago and western delivery, 750,000 tons was on order late in December. The use of track fastenings and accessories for road improvement has been tremendous and orders have been large. Car and locomotive buying was substantial but did not reach the proportions of 1922. The number of cars placed by domestic roads was approximately 100,000 compared with 180,000 in 1922, but with only 22,000 in 1921 and 80,000 in 1920. Locomotive orders in 1923 were about 2000 compared with 2300 the year previously. Probably 600,000 tons of steel went into the construction of railroad bridges and buildings in 1923.

Pig Iron Is Erratic

Three distinct stages were embraced by the pig iron market. The first of these extended through April and was marked by a continuity of liberal bookings by the furnaces from month to month running over from the preceding year. Prices rose steadily up to that point, the advance from January to April amounting to $3 to $5 per ton. Shipments by the furnaces having reached the peak in March, began to decline in April and continued to shrink until they had fallen probably 30 per cent from the maximum. Unshipped stocks ran up rapidly. New buying similarly was contracted and prices kept pace so that they had dropped $8 to $10 per ton by the latter part of November. At that time, buyers impressed by the attractiveness of the market, came out freely for their requirements through the first quarter of 1924. Total sales in November and December were probably 1,500,000 tons the bulk of which was closed within a few weeks. This buying activity turned prices upward and advances of $2 to $3 per ton resulted. At the beginning of 1924, pig iron producers had the largest order books since May. Furnace stocks, however, have mounted until they now are in excess of 1,000,000 tons and their size leaves uncertain the early future of the market.

Big Year in Building

Building operations in 1923 were one of the features and went a long way in making the year such a large one in steel demand. Bookings of structural steel were the heaviest on record and aggregated about 2,100,000 tons. This represents approximately 70 per cent of the country's workable capacity. In 1922, bookings were estimated at 1,920,000 tons. After falling to the low point in July awards made some recovery in the succeeding months but it was not until December that the gain was substantial. At that time considerable revival in the volume of contracts being placed and figured was shown. At the beginning of 1924 the list of projects pending or in immediate prospect was large and with plain material prices more established, the signs indicated a projection of the more active market into the coming months.

Domestic Iron and Steel Prices in 1923

Average Monthly Prices of Leading Materials at Pittsburgh

PIG IRON

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer	$29.27	$29.57	$31.67	$32.77	$32.07	$30.27	$28.52	$28.07	$28.27	$27.27	$25.47	$24.27
Basic	27.67	27.87	31.57	32.77	31.57	29.12	26.92	26.77	26.77	25.52	22.57	22.77
Foundry No. 2	28.77	28.77	31.37	32.77	31.97	29.52	27.37	26.47	26.52	25.17	23.77	23.77
Malleable	29.02	29.02	30.97	32.77	31.97	30.02	27.27	26.47	26.37	25.02	22.17	22.77
Gray Forge	27.77	27.87	30.77	31.77	31.17	29.02	27.02	26.27	26.27	24.52	23.27	23.27
Bessemer Ferrosilicon, 10 per cent.	44.50	45.50	47.10	48.50	48.50	48.00	46.50	43.50	43.50	43.50	41.50	41.50

SEMIFINISHED

Billets, Bessemer	$37.50	$38.85	$44.50	$46.00	$45.00	$42.90	$42.50	$42.50	$42.50	$41.50	$41.50	$40.00
Billets, Open Hearth	37.50	38.50	44.50	46.00	45.00	42.90	42.50	42.50	42.50	41.50	41.50	40.00
Sheet Bars, Bessemer	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
Sheet Bars, Open Hearth	37.50	39.25	44.50	45.85	45.40	42.90	42.50	42.50	42.50	42.50	42.50	42.50
Wire Rods	45.00	47.50	47.00	48.60	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00

COKE

Furnace, Spot	$8.25	$7.20	$7.15	$6.25	$5.10	$4.65	$4.35	$4.45	$4.55	$3.85	$3.80	$4.20
Foundry, Spot	9.00	8.60	8.15	7.80	6.10	5.50	5.15	5.20	5.70	4.80	4.85	5.15

ROLLED PRODUCTS

Structural Shapes, base	2.05c	2.15c	2.35c	2.45c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c
Plates, base	2.05c	2.15c	2.35c	2.45c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c
Steel Bars, base	2.00c	2.15c	2.30c	2.35c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c
Cold Finished Steel Bars, base	2.50c	2.65c	2.85c	3.00c	3.25c	3.25c	3.25c	3.25c	3.25c	3.25c	3.00c	2.90c
Strip, Hot Rolled base	2.75c	2.85c	3.10c	3.30c	3.30c	3.30c	3.20c	3.15c	3.10c	3.00c	3.00c	2.75c
Strip, Cold Rolled, base	4.50c	4.65c	4.80c	5.15c	5.25c	5.25c	5.00c	5.00c	5.00c	5.00c	5.00c	4.75c
Steel Pipe, 1 to 3-in. discount	66	64	64	63	62	62	62	62	62	62	62	62
Standard Spikes, base	2.85c	2.90c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.05c
Wire Nails, base	2.70c	2.75c	2.90c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c
Plain Wire, base	2.45c	2.60c	2.65c	2.70c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
Hoops, base	2.75c	2.85c	3.10c	3.30c	3.30c	3.30c	3.15c	3.15c	3.15c	3.15c	3.00c	2.90c
Bands, base	2.75c	2.85c	3.10c	3.30c	3.30c	3.30c	3.15c	3.15c	3.15c	3.15c	3.00c	2.90c
Structural Rivets, base	3.00c	3.00c	3.25c	3.25c	3.25c	3.25c	3.15c	3.00c	3.00c	3.00c	2.75c	2.90c
No. 28 Black Sheets	3.35c	3.35c	3.55c	3.85c	3.85c	3.85c	3.85c	3.85c	3.75c	3.75c	3.75c	3.75c
No. 10 Blue Annealed Sheets	2.50c	2.50c	2.70c	3.15c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	2.90c
No. 28 Galvanized Sheets	4.35c	4.35c	4.65c	5.00c	5.00c	5.00c	5.00c	5.00c	5.00c	5.00c	4.85c	4.90c
Tin Plate per base box	$4.75	$4.75	$4.95	$4.95	$5.50	$5.50	$5.50	$5.50	$5.50	$5.50	$5.50	$5.50

OLD MATERIAL

Heavy Melting Steel	$21.65	$23.40	$26.10	$25.85	$22.50	$20.50	$18.25	$17.50	$18.00	$16.10	$15.70	$18.50
Low Phosphorus	25.15	27.00	31.30	32.10	28.30	25.00	23.15	22.70	23.50	22.50	20.70	22.50
No. 1 Cast	22.65	24.50	27.70	27.75	25.60	23.75	21.50	21.10	21.50	19.35	18.50	20.00

Average Monthly Prices of Leading Materials at Chicago

PIG IRON

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lake Superior Charcoal	$33.15	$33.55	$35.55	$36.55	$36.65	$36.65	$36.60	$32.10	$32.05	$30.05	$28.65	$29.04
Northern No. 2 Foundry	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00
Southern No. 2 Foundry	29.21	30.26	32.51	33.01	33.01	32.26	33.01	29.61	28.63	26.21	25.26	27.01
Malleable	28.80	29.75	31.25	32.50	32.50	31.25	28.00	27.10	26.75	25.60	23.30	23.00

ROLLED PRODUCTS

Bar Iron, base	2.35c	2.45c	2.55c	2.60c	2.60c	2.60c	2.55c	2.50c	2.40c	2.40c	2.40c	2.40c
Rail Steel Bars, base	2.00c	2.05c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c
Steel Bars, base	2.08c	2.21c	2.34c	2.43c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c
Structural Shapes base	2.18c	2.31c	2.44c	2.53c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c
Plates, base	2.18c	2.31c	2.44c	2.53c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c
Sheets, No. 28 Black, base	3.59c	3.59c	3.65c	3.84c	4.19c	4.19c	4.19c	4.11c	4.09c	4.09c	4.09c	4.09c

OLD MATERIAL

Heavy Melting Steel	$18.70	$19.75	$23.15	$22.40	$19.75	$17.75	$17.10	$16.25	$16.55	$14.50	$13.80	$16.00
No. 1 Railroad Wrought	19.40	20.50	23.25	22.75	19.95	16.95	16.60	17.05	18.25	15.30	14.10	16.00
Rails for Rolling	20.55	22.00	24.90	23.65	21.80	19.40	18.40	17.75	18.30	16.25	15.10	17.00
Car Wheels	25.35	26.50	28.50	27.65	24.30	21.50	20.90	19.60	19.60	18.60	17.85	19.00
No. 1 Cast	24.30	25.75	28.50	27.55	24.20	23.25	23.25	21.20	21.50	20.40	20.55	21.50

Average Monthly Prices of Leading Materials in the East

PIG IRON

Basic, Eastern Pennsylvania	$27.70	$28.15	$29.35	$30.75	$30.75	$28.14	$27.25	$25.10	$25.10	*$24.00	$22.60	$23.20
No. 2X Foundry, Philadelphia	29.56	30.10	32.00	32.76	32.76	30.60	28.00	25.81	26.21	24.51	23.01	24.26
No. 2X Virginia, furnace	27.50	27.50	28.25	29.25	28.60	28.00	27.25	26.25	25.50	25.00	25.00	24.50
Standard Low Phosphorus, Phila.	†29.76	†31.36	35.45	*35.45	35.79	34.79	33.79	32.79	*30.50	*30.50	*30.00	30.00
Standard Gray Forge, Eastern Pa.	28.20	28.50	30.00	30.50	29.50	28.50	27.30	25.10	25.00	24.00	22.60	23.35

ROLLED PRODUCTS

Tank Plates base, Philadelphia	2.385c	2.525c	2.77c	2.945c	2.92c	2.845c	2.82c	2.82c	2.82c	2.72c	2.72c	2.72c
Structural Shapes, base, Phila	2.385c	2.525c	2.77c	2.845c	2.87c	2.82c	2.82c	2.82c	2.82c	2.72c	2.72c	2.72c
Steel Bars, base Philadelphia	2.385c	2.525c	2.705c	2.82c	2.77c	2.745c	2.72c	2.72c	2.72c	2.72c	2.72c	2.72c
Bar Iron, common base, Phila	2.365c	2.45c	2.705c	2.845c	2.82c	2.72c	2.72c	2.72c	2.72c	2.62c	2.62c	2.62c
Sheets No. 10 Blue Annld., Phila	2.95c	3.10c	3.22c	3.52c	3.42c	3.32c	3.32c	3.32c	3.32c	3.32c	3.32c	3.32c
Billets, Open Hearth, Philadelphia	$43.57	$45.17	$49.02	$50.17	$49.97	$47.42	$45.17	$45.17	$46.67	$46.67	$45.17	$45.17

OLD MATERIAL

No. 1 Heavy Melting Steel	$19.70	$21.20	$24.85	$23.50	$20.40	$18.65	$17.25	$16.00	$16.85	$15.50	$15.50	$17.00
No. 1 Railroad Wrought	22.25	24.10	27.60	27.00	24.40	22.75	18.85	17.50	19.00	18.00	17.75	19.00
No. 1 Heavy Cast	23.30	24.75	28.00	26.85	24.80	22.75	21.00	20.00	20.35	19.70	19.50	20.50

† These prices are based on English low phosphorus iron at Philadelphia.
* These prices are largely nominal.

Year's Pig Iron Output Largest

More Than 40,000,000 Tons Produced and Consumed—Two Major Movements With Quiet Buying Between—Competition of Steelworks Stacks Cuts into Merchant Market—Foreign Iron Able to Enter at Times

PIG iron made history in 1923, with the largest annual production to the present time, over 40,000,000 tons being made The nearest approach was in 1916 when 39,019,123 tons were produced.

As consumers' stocks were not much larger at the end of the year than at the beginning, although stocks on some makers' yards were heavier, 1923 apparently saw a record in consumption as well, notwithstanding periods when buying was hand-to-mouth. Purchases were carried on quietly except in two major buying movements, one in first quarter for second and third quarter and one in November for first quarter. The first saw a huge tonnage with successive sales at increasing prices, 50c to $1 per ton at a time until the market reached $31 or higher. The second was inspired after a long dull period by low prices such as $18.50 at Buffalo, to meet which valley furnaces went to $19.50 or $20, thereby arriving at the price which buyers had mentally pegged as the point from which a turn upward would take place, since they knew such figures in many cases went below production costs. More than 1,000,000 tons were booked in November in the Chicago, Buffalo, Cleveland, Pittsburgh and Philadelphia sections.

Consumers were encouraged to buy for first quarter in November since while the scrap market had advanced, pig iron had declined $10 or $12 per ton below the high point of the previous March. While many consumers contributed to the million-ton sales in November, numerous large tonnages were bought by middle interests for speculation. Increases of $1 or $2 per ton were brought about in late November but larger consumers by that time were under contract and only small sales were made in various districts. The year ended with a quiet market and small lot buying, with only an occasional 1000 to 5000-ton lot.

On the rising tide of prices starting shortly after the first of the year, blast furnaces resumed until 322 were active in May, the largest number active since December, 1918, when 351 were in blast. The highest number active at any time was in August, 1918, when 371 were blowing.

Failure to realize upon predictions of $35 iron made in March is traceable to a period of overproduction then commencing. The heavy domestic output, with large shipments from Scotland, England, Belgium, France and Czecho-Slovakia flooded the market and made buyers indifferent about forward purchases. This foreign iron at times brought prices the equivalent of domestic market figures but at other times furnished competition although during a period of railroad embargoes into New England, considerable foreign iron was sold in Boston at relatively high figures.

Because of fear of the effect of overproduction, blast furnace operators commenced to curtail in July until at the end of the year only about 230 blast furnaces were blowing.

Last half opened with quotations dropping severely and each succeeding sale was at 50 cents or more under the last preceding one, a direct reversal of February and March. Melting decreased, particularly among jobbing foundries, but because consumers' stocks were low small orders were placed and gave a semblance of activity. In last half some foreign iron, by no means comparable with the quantity received in the first quarter, came in from India, England and Scotland as prices were favorable.

Steelworks competition in pig iron sales was keen This was not only a dominating influence at times but a trying factor for the merchant furnaces, since steelworks stacks, with lower costs could sell at lower figures than merchant furnaces. Closely related to this condition were various mergers, mainly those effected by the Youngstown Sheet & Tube Co., and by the Bethlehem Steel Co. The former always was more or less of a factor in open market pig iron selling and as regards the latter, the Cambria Steel Co., always had a regular pig iron buying clientele. But the merged companies have more iron to offer than the separate companies. The increased use of scrap in open-hearth furnaces and bessemer converters must be reckoned with. Formerly it was not extraordinary for a steelworks to buy much pig iron in the open market. That was when a low percentage of scrap was utilized. Now the scrap content is at least equal to pig iron and in some cases more scrap than pig iron is used to make steel. Consequently steelworks have excess pig iron capacity and have become sellers in an important way.

An idea of the trend of prices is furnished by the following averages compiled by W. P. Snyder & Co., on basic and bessemer:

	Bessemer		Basic	
	1922	1923	1922	1923
Jan.	$19.59	$27.50	$18.19	$25.58
Feb.	19.50	28.02	17.75	26.38
Mar.	19.39	30.26	18.00	30.02
April ...	20.54	31.00	19.30	31.00
May	24.40	30.10	24.91	28.06
June	25.00	28.50	25.00	26.57
July	25.00	26.70	24.55	24.75
Aug.	28.67	26.50	25.41	25.00
Sept. ...	33.50	26.50	32.93	24.50
Oct.	33.50	25.20	30.00	23.25
Nov.	31.75	23.03	27.60	20.81
Dec.	28.10	*23.00	24.75	*21.00
Average	25.75	*27.19¼	24.02	*25.57 2/3

*Estimated.

Coke Ovens Doubled Production Effort

MORE than doubling their production effort of 1922 was the Connellsville beehive coke oven operators' answer to the effort of blast furnace operators in 1923 when the latter made more pig iron than ever before in their histories. Since, however, the 1923 coke production was a little less than one-half of the 1916 output, the banner year with 21,654,502 tons, it is safe to assume that a greater contribution than ever was made to blast furnace practice by by-product coke. Several instances were recorded where merchant furnaces turned to the by-product grade and some at present still are utilizing it.

The wave of beehive coke demand in the first half reached its crest the week of June 23 when 306,720 tons was produced, against 68,050 tons in the corresponding week of 1922. The year opened with a coke buying movement in progress, mainly as a substitute for anthracite coal, which loaned strength to the blast furnace and foundry grades. Late in the preceding year blast furnace coke contracts were taken at $7 to $7.50 for the first quarter of 1923. Some who waited until January paid $8 to $8.50 for filling-in as well as contract tonnages. By

February the price had declined to $6.75 to $7, at which time numerous contracts were closed for second quarter. On the strength of increasing demand the price worked upward until in the latter part of March $7.50 and $7.60 were the prevailing levels. Early in April a decline set in, contracts going to $7 to $7.25, while spot sales were made as low as $6.75.

Considerable demand developed abroad in March and middle interests commenced to buy up large tonnages, ordering them shipped to seaboard. Coke oven operators, confidently believing this foreign demand would be sustained for a long period, increased their output weekly. Soon the piers became flooded with coke for which no destinations had been provided and railroads inaugurated numerous embargoes which created large lots of distress coke with low prices.

By early May, standard coke had receded to $5. A few blast furnaces contracted at 50 cents higher but others held off until June and closed at $5.25. Then the market slowed up considerably and spot sales were recorded at $4.50. Contracts placed at higher figures were revised to harmonize with prevailing market levels.

Demand for medium sulphur coke took precedence and many smelters closed for 3000 to 10,000 tons at a time. Users of anthracite coal, too, became active as purchasers of coke as a substitute for the period of the anthracite strike. Blast furnaces were blown out and banked and general weakness in the standard 48-hour fuel market developed so that prices on it and medium sulphur coke were on a par at a $4 minimum. Curtailed production brought slight strength and in September $5.25 to $5.50 were the quoted levels on furnace contracts.

Weakness followed the settlement of the anthracite strike and fourth quarter contracts developed $5 quotations. Due to uncertainty regarding the price situation, however, many covered their needs in the spot market as low as $4.25. In October numerous blast furnaces became inactive, one coke maker losing orders totalling 65,000 tons monthly. Drastic cuts in coke production then occurred but prices as low as $3.50 appeared spasmodically and $3.75 to $4 were openly quoted. Negotiations for first quarter 1924 supplies found the coke makers disinclined to name prices below cost and from $4 to $4.50 was the spread quoted, several contracts being noted at $4.25 to $4.40.

Similar fluctuations took place in connection with foundry coke. It started the year with $9 to $9.50 and in December $4.75 to $6 was the quotable market. All year two or three brands commanded premiums of $1 to $2 per ton over the regular market prices.

By-product coke enjoyed an increased demand for blast furnace use although as usual much was used in foundry operation in the East as well as Detroit, St. Louis, Birmingham, Cincinnati, and other sections. Indicative of the trend of by-product coke prices, the Seaboard By-Products Coke Corp. commenced the year quoting $12.84 to $12.91, delivered to Newark and other northern New Jersey foundries. These were reduced May 1, June 5 and July 1 by 50 cents per ton. On Nov. 6 its price became $10.91, which held throughout December.

Wire Sales Heavy at Advancing Prices

NOT ONLY was the base quotation on wire and nails advanced steadily through first half of 1923 but a change in extras early in the year made a general advance, the selling price increasing materially. This was especially true of first half. Extras for size and galvanizing increased, and a $3 differential over plain wire was placed on annealed wire. The effect is to equalize prices and remove inequalities that had crept in through several years.

Prices Jan. 1 were $2 above December. Independent makers were $2 per ton above the leading producer on annealed wire early in the year but the latter soon advanced equally. In February prices were advanced $2 per ton under heavy buying, which was not checked by that action. In March a rise of $2 per ton on nails and $5 on barbed wire and staples was made. Inasmuch as some makers advanced single products while others made increases on all products an irregularity developed in second quarter. This was corrected by lower figures being raised under stress of demand.

Bookings of 60 to 90 days were in the hands of mills at the beginning of the year and this was not lessened until the final quarter, while much heavier backlogs were accumulated at times. Sales were scrutinized and buyers with tonnage on books were not allowed to contract further. This restraint at times was virtual allocation.

First quarter sales were considered the heaviest in the history of the industry. As usual during a movement of such size, consumers pressed vigorously for delivery and with output restricted producers were unable to meet consumers' requirements. Sales were greater than production until nearly mid-year and increased mill operations sufficed only to meet increased buying. Specifications were filed unusually heavily during first quarter and consumers then slacked considerably as all were covered liberally. Fall buying and needs of Japan for rebuilding after the earthquake came into the market simultaneously and gave a period of heavy demand.

Toward the end of the year in this market, as in practically all departments of the steel industry, consumers adopted a course of conservatism and if not covered bought only for current needs, delaying their tonnages until aftetr inventory. While heavy requirements for 1924 were forecast these did not go on mill books at the usual time and the market had a slack appearance that belied the real condition.

Wire and its products were scarce early because of large consuming demand and as mills were unable to attain production near capacity, caused by shortage and lack of raw material, separately and in conjunction. As steel mills supplied more wire rods and labor conditions eased, allowing higher wire operating rate, consumers received more nearly their requirements.

Periodical Shortages in Steel Supplies

BECAUSE of large needs in their own finishing departments, periodical short supply of various forms of semifinished material, mainly sheet bars, were noted in 1923 by steel mills. At different periods, notably in the first half these shortages extended to the various units of the United States Steel Corp., such as the American Sheet & Tin Plate Co., on sheet bars and the National Tube Co., on billets and skelp. Purchases were made in the open market, one outstanding tonnage being 100,000 tons of slabs and 75,000 tons of tube rounds.

Sheet bar makers in the Mahoning valley had obligated themselves so heavily for the first quarter late in November, 1922 that by the middle of January the majority were out of the market. The beginning of the second quarter found at least two places for every pound of sheet bars produced and premiums commenced to be offered. Practically no free tonnage was to be had and transient buyers endured considerable hardship. In May the open-hearth steel shortage was so acute that numerous buyers gave attention to the use of bessemer as a substitute and in some directions this was done extensively.

The official sheet bar, billet and slab price at the beginning of the year was $36.50. In Feburary, nominal markets began with $38.50, $40 and $42.50 quoted in respective weeks on sheet bars, billets and slabs, with consumers loath to place their second quarter business at the latter relatively high level. On March 6, however, a Cleveland maker obtained $45, Cleveland or Youngstown, on second quarter billets. The sheet bar market was clarified in that month by a sale at $42.50 and a month later $5 higher prevailed. Rerolling billets sold in the East in April as high as $50. Youngstown and other makers allocated their tonnage to regular customers for the third quarter at $45 but the majority returned the contracts unsigned. Open market purchases were the rule and in general these receded to $42.50. Contracts were revised on that basis. This level was generally recognized as the market price for the third quarter.

Near the close of 1923, billets and slabs again were procurable at $40, Pittsburgh or Youngstown, but the sheet bar price remained firm at $42.50.

Most of the time forging billets commanded their usual premium of $5 over 4 x 4-inch rerolling billets. At times however, a large figure was available such as $55 the latter part of March and again in May and $58 in April.

Wire rods supplies too, were short of the needs of various buyers. The usual figure quoted at the beginning of the year was $50 to $53, the $47.50 official figure then being nominal. Export tonnages brought $55 to $57.50. In Feburary the American Steel & Wire Co., commenced to quote two bases, $47 on No. 5 and $49.50 on heavier. Two advances of $2 each were inaugurated, and while premium prices as high as $60 were paid in May, the market became more clarified in June at $51 and $53.50 for the third and last quarters. Due to expansion in their wire products business, large makers are restricting the quantities of rods they are offering for sale.

Skelp's position all year was strong and in the first half came far short of supplying the visible demand of pipe and tube makers. Early in the year it was quoted at 2.00c to 2.25c. By March it had advanced to 2.75c to 3.00c which levels receded in May $5 or $6 per ton. During the last half little new demand developed outside of contractural arrangements. Some effort was made to maintain plate bases of 2.50c, but some concessions of 2.40c were made and in November and December skelp was available as low as 2.35c.

Rails Are Featured by Unusual Activity

UNUSUAL activity was reflected in production and sale of heavy steel rails during 1923. Mills started the year with large order books as a result of heavy buying in September, 1922, when many roads bought for 1923 at $40 base mill. Indications point to another heavy rail year in 1924. Buying for 1924 started in May and at the close of the year rail mills were booked through the first half of 1924 and in some cases through July and August. Business booked in 1923 was taken at $43, base mill. One railmaker in June quoted an extra of $2 on 110 to 130-pound rails, but this later was withdrawn. A fair amount of export rail business went to American makers, notably from Imperial Railways of Japan and South Manchurian railways, but principal foreign business went to European mills.

Light rails, 25 to 45-pound sections, reduced from billets, enjoyed a good demand in the first half of 1923. Sales started to decrease in June when coal mining became restricted, the shrinkage becoming more pronounced as the year ended. In January the ruling price was 2.15c, base Pittsburgh. By February it advanced to 2.25c and this prevailed although some business was taken in the last quarter at 2.15c. Rerollers quoted about the same prices early in the year but at the close were selling $5 to $10 a ton lower.

Heavy buying of rails brought a corresponding tonnage of track fastenings and heavy maintenance work caused railroads to buy large supplies of spikes, bolts, tieplates and angle bars. Prices were practically stationary. Bookings of track fastenings for 1924 delivery are large and furnish an encouraging backlog for steel mills.

The average prices paid for steel rails in the United States from 1901 to 1923 follow:

1923	$43.00
1922	40.75
1921	45.68
1920	52.64
1919	47.50
1918	57.00
1917	38.00
1916	32.75
1902 to 1915	28.00
1901	27.40

Light Rail Prices by Quarters, 1914-1923

Per Pound and Per Gross Ton

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
Jan. 1....	1.25c	1.07c	1.55c	$50.00	3.00c	2.75c	2.45c	3.00c	1.50c	2.15c
April 1....	1.25c	1.07c	2.10c	55.00	3.00c	2.45c	3.25c	2.50c	1.60c	2.25c
July 1....	1.25c	1.07c	$47.00	$70-$80	3.00c	2.45c	3.75c	2.20c	1.75c	2.25c
Oct. 1....	1.25c	1.25c	47.00	75.00	3.00c	2.45c	3.50c	1.65c	2.15c	2.15c

Weakness Marks Coke By-Products

THE leading coal tar by-products were generally weak and lower priced during the year. Heavy production in the preceding year, brought large distillate supplies, which more than met the active demand early in the year for motor fuel. New sources of outlet were developed and as the situation improved gasoline from California crude oils was placed upon the market, interfering not only with the sale of motor fuel, but also with industrial distillates. Foreign countries, ordinarily good buyers noting a weakening, contributed to the dullness by holding off their purchases.

In the summer good export business was placed, and demand developed for fuel. Sellers of gasoline, began generally to use motor fuel with gasoline. This business aided sellers to tide over the lean months, and in last of the year with contracting for the present year a large proportion of distillate production was going into motor fuel. However, a number of the smaller sellers were not able to provide a steady source of motor fuel production, placing distillates, particularly benzol, on the market at concessions, thus influenced the market considerably.

In sulphate of ammonia, export buying during the first three or four months was heavy, with prices advancing from $3.45 to $3.80 late by April, continuing fairly good until July. Heavy domestic buying came in May, annual contracts being placed at about a $3 advance over 1922. In the second half, business became decidedly dull. The earthquake in Japan, with the resultant unsettled market conditions in that country, caused the postponement of deliveries on many contracts.

Coal Tar Products Market in 1923

Producer prices, f. o. b. works

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Benzol	$0.30	$0.30	$0.30	$0.30	$0.29	$0.26	$0.26	$0.26	$0.24	$0.22	$0.215	$0.21
Tuluol	0.30	0.30	0.30	0.30	0.30	0 .30	0.30	0.30	0.26	0.25	0.24	0.24
Solvent Naphtha	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.25	0.25	0.24	0.24
Phenol	0.24	0.24	0.24	0.24	0.26	0.26	0.28	0.28	0.27	0.26	0.26	0.27
Naphthalene Flakes	0.065	0.07	0.85	0.09	0.10	0.095	0.08	0.08	0.08	0.075	0.075	0.08
Naphthalene Balls	0.075	0.08	0.95	0.10	0.11	0.10	0.09	0.09	0.09	0.085	0.085	0.09
Spot Sulphate of Ammonia	3.10	3.175	3.225	3.225	3.20	3.15	3.10	3.075	3.00	2.95	2.85	2.775

Pipe Makers Unable To Meet Demands

INABILITY of pipe makers to keep pace with demand in first half and for buttweld the whole year marked 1923. Ninety-day backlogs were the rule and producers often had more than that on their books. Sustained consumption prevented jobbers acquiring normal stocks and extensive building programs promise similar demand in 1924. Mill stocks depleted in 1922 were not replenished and production for stock would require 30 to 90 days.

Except during spring and summer, labor shortages production was 80 to 90 per cent. The 8-hour workday was believed to have cut output about 10 per cent. More serious was the labor exodus in the summer, preventing producers filling pressing orders. By April makers were selecting tonnages. Regular customers were not allowed to pyramid and speculative buying was prevented. In March additional orders depended on how much was due the buyer. By April many producers quoted prices at time of delivery.

Demand for oil country goods was particularly heavy during first half but later crude oil cuts stopped drilling and stopped pipe buying. Activity in gas drilling in Pennsylvania, Ohio and West Virginia in last quarter brought demand for gas sizes.

Price changes were confined to the first four months. Until Feb. 1 66 per cent off prevailed on 1 to 3-inch black pipe, though a Wheeling maker asked $4 per ton higher on black and $2 per ton higher on galvanized. Independents advanced Feb. 1 by $4 to $5 per ton and Feb. 3 the National Tube Co. followed, quoting 64 off on black. At that preferential discounts to jobbers were eliminated. March 19 the Wheeling producer issued a card, $6 per ton above the market, quoting 61 off on black and 49½ off on galvanized. The National Tube Co. and independent makers advanced $4 to $14 per ton April 19, making the discount 62 off on black and 50½ off on galvanized. Aug. 1 the Wheeling came to the same level and this market continued to the end of the year. Wrought pipe makers advanced Jan. 25 by $8 to $20 per ton, on various sizes and these prices held through the year.

Changes in Discounts on Steel Pipe

Date	Sizes in inches	Butt Weld — Basing Black	Butt Weld — Discount Galv.
Jan. 1, 1910 to Oct. 1, 1910	¼ to 6	78	68
Oct. 1, 1910 to Oct. 2, 1911	2 to 3	80	70
Oct. 2, 1911 to Dec. 1, 1911	2 to 3	81	74
Dec. 1, 1911 to Dec. 15, 1911	2 to 3	83	76
Dec. 15, 1911 to Jan. 1, 1912	2 to 3	83	76
Jan. 1, 1912 to July 1, 1912	2 to 3	82	75
July 1, 1912 to July 24, 1912	2 to 3	82	75
July 24, 1912 to Sept. 10, 1912	2 to 3	81	74
Sept. 10, 1912 to Jan. 1, 1913	2 to 3	80	72
Jan. 1, 1913 to April 12, 1913	¼ to 3	80	71½
April 12, 1913 to May 27, 1913	¼ to 3	79½	71
May 27, 1913 to Aug. 8, 1913	¼ to 3	79	70½
Aug. 8, 1913 to Oct. 27, 1913	¼ to 3	80	71½
Oct. 27, 1913 to Feb. 2, 1914	¼ to 3	80	71½
Feb. 2, 1914 to April 20, 1914	¼ to 3	79½	71
April 20, 1914 to Nov. 2, 1914	¼ to 3	80	71½
Nov. 2, 1914 to Feb. 11, 1915	¼ to 3	82	72½
Feb. 11, 1915 to May 1, 1915	¼ to 3	80	69½
May 1, 1915 to June 1, 1915	¼ to 3	79	68½
June 1, 1915 to June 17, 1915	¼ to 3	79	63½
June 17, 1915 to Aug. 15, 1915	¼ to 3	79	57½
Aug. 15, 1915 to Nov. 1, 1915	¼ to 3	79	63½
Nov. 1, 1915 to Jan. 4, 1916	¼ to 3	78	63½
Jan. 4, 1916 to Jan. 20, 1916	¼ to 3	77	62½
Jan. 20, 1916 to Feb. 15, 1916	¼ to 3	76	60½
Feb. 15, 1916 to Feb. 29, 1916	¼ to 3	75	59½
Feb. 29, 1916 to Mar. 15, 1916	¼ to 3	74	57½
Mar. 15, 1916 to Mar. 29, 1916	¼ to 3	73	55½
Mar. 29, 1916 to April 21, 1916	¼ to 3	72	53½
April 21, 1916 to July 24, 1916	¼ to 3	70	50½
July 24, 1916 to Sept. 7, 1916	¼ to 3	70	55½
Sept. 7, 1916 to Nov. 1, 1916	¼ to 3	69	55½
Nov. 1, 1916 to Nov. 15, 1916	¼ to 3	69	55½
Nov. 15, 1916 to Dec. 4, 1916	¼ to 3	68	54½
Dec. 4, 1916 to Dec. 30, 1916	¼ to 3	66	52½
Dec. 30, 1916 to Feb. 14, 1917	⅜ to 3	64	56½
Feb. 14, 1917 to Mar. 5, 1917	¼ to 3	62	48½
Mar. 5, 1917 to April 2, 1917	¼ to 3	60	46½
April 2, 1917 to Nov. 6, 1917	¼ to 3	55	41½
Nov. 6, 1917 to Jan. 1, 1919	¼ to 3	51	37½
Jan. 1, 1919 to Mar. 21, 1919	¼ to 3	54	40½
*Mar. 21, 1919 to April 13, 1921	¼ to 3	57½	44
April 13, 1921 to July 7, 1921	1 to 3	62½	50
July 7, 1921 to Sept. 16, 1921	1 to 3	64½	52
Sept. 16, 1921 to Dec. 15, 1921	1 to 3	68½	56
Dec. 15, 1921 to Aug. 17, 1922	1 to 3	71	58½
Aug. 17, 1922 to Oct. 19, 1922	1 to 3	68	56½
Oct. 19, 1922 to Feb. 13, 1923	1 to 3	66	54½
Feb. 13, 1923 to April 19, 1923	1 to 3	64	52½
April 19, 1923 to date	1 to 3	62	50½

*Level adopted by independent companies Dec. 31, 1920.

Scrap Market Steady Struggle

Consumers Resist Prices Quoted by Sellers While Latter Seek Continuously To Force Prices Upward—Expectation Held Steadily of Buying Movement Which Failed To Appear Though Strength Came Later

THROUGH practically all of 1923 consumers of iron and steel scrap resisted prices asked by dealers and the latter as consistently looked each week for the promised buying movement and higher prices, which every condition continually seemed to forecast. The year was unusual in the long continuance of the silent struggle which was like a tug of war with neither side winning decisively and the same condition being carried over into the new year. Yet dealers appear to have sold a large tonnage of scrap and consumers have had all they have required for their large production. At the beginning of the year a number of contracts held over from 1922 and the declining market made it possible for dealers to pay above the current quotation and yet be able to deliver tonnage at a fine profit.

From January to December consumers stayed out of the market and forced dealers to do the selling. Always there was an offer for steel or other grades of scrap at about $1 under the going figure. If a dealer met that offer the new price was at a lower level. At an early period dealers did some speculative buying, prices at a level below the preceding year, apparently offering chance of a profit. An apparent scarcity existed for a time and these factors brought a substantial advance in quotations through first quarter, the successive increases aggregating a large part of previous losses in the general downward movement.

Scrap users apparently were sure of their ground and stood firm in their determination not to be stampeded by advances and talk of scarcity and after nearly three months' resistance they won the day and a decline started that lasted to the end of the year. With such success, consumers continued to resist and carried the same tactics through the remaining months, with the result they were able to buy the market down and obtain a consantly decreasing price.

Efforts by holders of scrap to stem this decline were not efficacious, although in August, and extending into September, a better tone developed and a slight advance in prices came about. This was short-lived and by October a further decline followed the period of no buying.

Late in the year dealers generally agreed that prices had reached a level relative to other commodities that warranted safety in accumulating stock and considerable tonnages went into yards to await a better situation. Railroad accumulations, which had been moderate through most of the year, began to be offered more freely just before winter's approach and much of this went into yards on speculation.

The situation through the year was peculiar, no period of active buying appearing, and from week to week there seemed to be nothing but small buying and absorption of such tonnages as seemed bargains. At times special grades were in demand by foundries dependent on this source for their raw material, but there seemed always plenty at moderate prices. Yet all consumers obtained as much scrap as they required through the year and dealers must have sold a tremendous total of scrap, without its making a definite impression on the market.

Taken as a whole the year presented no feature in the iron and steel scrap market except as the constant struggle between consumer and seller gradually wore down the price structure to a lower level.

At the close the same deadlock existed, neither side yielding markedly, and considerable stocks in yards apparently having little effect on prices, which strengthened generally on important grades in principal centers,

Refractory Output and Prices Steady

STEADY production, sustained shipments, and few price changes were some of the features of the refractories market in 1923. Peak activity in March, with new orders for fire clay at the record rate of 126 per cent of capacity, was followed by a steady decline in that grade for the second quarter and a slight increase for the third quarter, which increased ratio of new business to over 60 per cent, was maintained each month through last half. In silica, however, an average of about 40 per cent was maintained through the last nine months, new orders reaching 134 per cent of capacity in March.

Kiln operators then began to be confronted by operating difficulties such as labor and car shortages, and at the same time orders for large quantities of brick were being received. Production and shipments of fire clay remained fairly even, production averaging 79 per cent for the first quarter, 83 per cent for the second, 75 per cent for the third, and about 75 per cent for the fourth, while shipments showed 78, 81, and 71 per cent respectively, and slightly in excess of 70 per cent for the final quarter. Production of silica by quarters averaged 56, 56, 48, and 45 per cent, while shipments were on a basis of about 57, 59, 48, and 40 per cent.

The year opened with No. 1 Pennsylvania fire clay at $43 to $46, and silica at $42 to $44. Late in March demand was sufficiently large to sustain an increase of $5. Incoming orders and contracts were so numerous, some for the third quarter, that makers were inclined to name prices prevailing at time of delivery. In April came a wage advance of about 11 per cent, similar to that inaugurated in the steel industry. By June, consumers were cutting down inventories greatly and concessions appeared in silica. July 1 that grade was reduced $2 per thousand, to $45. A period then ensued when consumers were ordering only what brick they needed and shortly after the middle of August fire clay declined $3, going back to $45 to $48. This reduction failed to stimulate the market and only meager tonnages were booked. Oct. 10, prices were reduced $3 further, fire clay going to $42 to $45, and silica to $42. Probably 75 per cent of the silica brick manufacturers maintained that level the remainder

of the year but smaller producers immediately named $40, and the year ended with a few quoting as low as $38.

Chrome brick and magnesite remained firm at $50 and $65, respectively, until early in December when chrome brick was reduced $2 to $3, going to $47 on contracts and $48 on spot tonnages.

The majority of orders for fire clay and silica involved 50,000 to 250,000 brick, occasionally larger lots were bought for linings or for new construction, such as for expansion programs carried on by the Otis Steel Co., the Wisconsin Steel Co., the Trumbull-Cliffs Furnace Co., St. Louis Coke & Chemical Co., National Tube Co., and Carnegie Steel Co. Outside of the steel industry, large lots were taken by the Duquesne Light Co., the West Penn Power Co., and others for boiler settings and similar work.

Manganese Duty Has Little Effect

DEVELOPments in ferromanganese during 1923 indicate the present duty, the highest ever applied to this metal, has failed to encourage much domestic production of manganese ore. Foreign ore continues the source of almost the entire American production of ferromanganese. Thus, the duty serves entirely as revenue and comes entirely from steel producers without affording benefit to manganese ore miners.

Imports and Domestic Production of Manganese Alloys—Imports of Manganese Ore

In Gross Tons

	Production		Imports		Imports
	Ferro-manganese	Spiegel-eisen	Ferro-manganese	Spiegel-eisen	Manganese ore
1923*.....	240,000	123,000	108,000	.....	202,000
1922.....	150,039	68,589	72,011	.....	374,451
1921.....	100,694	55,042	9,057	.....	401,000
1920.....	286,365	110,685	59,254	.....	601,437
1919.....	175,009	84,014	33,022	.....	333,344
1918.....	325,133	303,535	27,168	.....	491,303
1917.....	328,000	187,000	51,800	.....	663,500
1916.....	275,204	187,233	90,928	.....	576,321
1915.....	144,260	114,556	55,263	200	313,985
1914.....	100,731	76,625	82,997	2,870	283,294
1913.....	119,495	106,980	128,070	77	345,090
1912.....	125,378	102,561	99,137	1,015	300,661
1911.....	74,602	104,013	80,263	20,970	176,852
1910.....	71,376	153,055	114,228	25,383	242,348
1909.....	82,209	142,831	88,934	16,921	212,765
1908.....	40,642	111,376	44,624	4,579	178,203
1907.....	55,918	283,430	87,400	48,994	209,021
1906.....	55,520	244,980	84,359	103,268	221,260
1905.....	62,186	227,797	52,841	55,457	257,033

*Estimated.

Nor has the duty afforded a monopoly to domestic producers. During the first 10 months of 1923 ferromanganese imports were about 103,000 gross tons, so that it seems certain total imports for the year will be reported 108,000 to 110,000 tons. In the past 20 years, imports of 1923 were exceeded only twice, 1913 and 1910. On the basis of the above calculation, and estimating domestic production at 250,000 to 255,000 gross tons, imports supplied about 30 per cent of domestic consumption. This is notable as in the preceding biggest ferromanganese year, 1920, before the present duty became effective, imports were only 17 per cent of domestic consumption.

As was foretold in the Jan. 4, 1923, issue of IRON TRADE REVIEW, a scarcity of ferromanganese developed during first half. At the beginning of the year the price was $100 duty paid tidewater, and heavy sales were attended by advances. In April the price was established at $120 for shipment at makers' convenience and the supply was sold practically to September. Spot and nearby metal commanded $125 to $135. First hands in May and June marked up their minimum price to $125 but the movement had reached its crest and an easier tendency developed. Resale material was sold under the first hand price and brought out reductions in the latter. Resales were made as low as $107 to $110 but about October the resale supply seemed liquidated. In July importers reduced to $117.50 and in October to $110 which they maintained the remainder of the year. Domestic makers in September reduced to $112.50 and in November sold considerable tonnage at $106 to $107.50, after which their minimum became $109.

Some German ferromanganese was sold early in the year but was not a factor here owing to the effects of the French invasion of the Ruhr.

Conditions in spiegeleisen paralleled those in ferromanganese. At the beginning of the year, with output sold well ahead, prices ranged from $32 to $36, furnace, for 20 per cent. By March, output had been sold substantially through July. By May the forward price had gone to $45 to $47.50 while spot and nearby deliveries were bringing $50 to $55. Early in June the market showed an easier tendency and spot sold at $47.50 to $50. In September sales were made at $44 to $45. In October there was a sharp break at $38 to $40, which continued remainder of the year.

Consumption of the special ferroalloys entering into the manufacture of high speed and general alloy steels reached proportions unequalled in any peacetime year, though considerably under the wartime rate. But no real shortage was experienced as productive facilities established during the war met all demand readily. Excepting for 579,000 pounds of tungsten in ferrotungsten, no imports of tungsten were made, the country living almost entirely from stocks on hand when the 1922 tariff was enacted. Prices then rose from $2.75 to $7 a short ton unit, in the course of a month, but the price for ordinary wolframite of $8 a unit in December, 1923, was only 50 cents a unit above the price in December, 1922. The price of ferrotungsten during much of the year was barely if any above the cost of production, due to keen competition. Ferrotungsten prices this year ranged between 81 and 95 cents a pound.

Most consumers of 4 to 6 per cent carbon ferrochrome were covered for 1923 under yearly contracts placed at 12 cents a pound, contained, specifying shipments during the year. Prices of low carbon grades were dominated by import offerings, due to falling rates of foreign exchange which reduced replacement costs of stocks of the alloy here.

Most 1923 contracts for 50 per cent ferrosilicon were placed at $82.50 to $85, delivered, but the open market reached $95 in the early spring, sagging to $80 in November. Some 1924 contracts were placed at $80.

The leading producer of vanadium maintained the base price of its open-hearth grade, which is the tonnage grade, at $3.50 a pound contained, through the year. Tool steel grades were quoted between $3.75 and $4.25. Operations in the Peruvian mines resumed in the autumn after a two-year shutdown.

Steel Plate Production Large

Railroad Car and Locomotive Purchases Constitute Backbone of Market—Oil Storage Tanks Take Unprecedented Volume—Shipbuilding Consumption Negligible—Upwards of 80,000 Cars in Sight for Closing in 1924

LARGE production featured the steel plate industry during 1923. Railroad car and locomotive requirements constituted the backbone of the market. Continuance of heavy railroad business into 1924 is expected because of large car inquiries under negotiation.

Great activity was reflected in construction of oil storage tanks, purchases of which were unprecedented in volume. Considerable tonnage of plates went into riveted pipe lines and other construction. Good demands came from all regular lines of consumption excepting shipbuilding. Indications point clearly to the fact that the main backlog of plate business prior to the war, namely shipbuilding, has been virtually wiped out for years to come.

From a price standpoint, 1923 business was far more desirable than that in 1922. The average price of tank plates for 1923 was 2.417c, base Pittsburgh, compared with 1.729c, for 1922, and 1.498c for the period 1904-1913. These prices are not truly comparative as far as producers were concerned, as costs were increased by reason of elimination of the 12-hour day. The average shipping price during 1923 was lower than the average selling price shown above, as the major portion of tonnage rolled was shipped on contracts booked at lower prices prevailing late in 1922 and early in 1923.

Generally, 2.00c, base Pittsburgh, became a firm price early in January and the advance continued until leading producers, in April, established the 2.50c price to which they adhered during the remainder of the year. As a result of the sold-up condition of larger makers, eastern mills early in the year booked much business at premiums for quick shipment. In April these mills obtained 2.65c to 2.75c, base Pittsburgh for early delivery and on some shipments to western and middle western consumers, they obtained higher than 3.00c, base mill. With the beginning of May, the eastern price dropped until late in the year the usual quotation on plates was 2.40c, base Pittsburgh, with some concessions.

Considerable difficulty was experienced during the first half of 1923 in getting out full production, due to labor shortage. Use of copper-bearing steel increased during the year, especially for railroad cars, being specified for its resistance to corrosion.

Car buying in 1923 did not approach the volume of 1922 business, but orders in sight in December involving upwards of 80,000 indicated continuance of good demand well into 1924. Practially all car purchases in 1923 came from domestic sources. Following is a comparative statement of buying for domestic use from 1920-1923:

	1923	1922	1921	1920
January	15,000	11,000	1,700	4,500
February	9,300	14,500	200	7,000
March	42,479	12,000	1,400	5,500
April	9,800	31,500	350	20,500
May	2,200	18,250	250	8,000
June	1,785	13,100	1,500	5,500
July	1,450	13,700	900	7,000
August	2,777	1,610	150	7,000
September	897	10,350	550	3,500
October	1,125	12,700	6,500	6,500
November	5,050	18,500	7,000	2,500
December	*10,000	23,255	550	2,500
Total	*100,883	180,465	22,050	80,000

*Estimated.

Locomotive buying totaled about 2000, as against 2300 in 1922, the major portion being bought in the first four months.

Shape Bookings Break All Records

STRUCTURAL buying in 1923 surpassed all records. Actual reported bookings are estimated to exceed 1,750,000 tons, as compared with 1,690,566 tons in 1922, the previous record. On the basis of total tonnage booked, but not accounted for, business for the past year was nearer 2,100,000 tons, or 70 per cent of the country's annual capacity of 3,000,000 tons, as given by the department of commerce. Bookings in this volume approximate rather closely the country's workable capacity in view of labor shortage. In 1922 bookings were estimated at approximately 1,920,000 tons.

March, with 220,400 tons of reported business, exceeded any other month in history of the industry, and the first quarter, with a total of 578,581 tons, was better than any other quarter or 3-month period.

In 1922 business was comprised mostly of commercial and civic work. During the first 11 months this work totaled more than 150,000 tons, and included such items as a station, Chicago, 20,000 tons, and the Equitable building, New York, 18,000 tons. School work was an important feature. In New York the year's program called for 80,000 tons, much of which was placed.

Important strides were made in industrial building, especially power plant construction. The more important were the plant of the Commonwealth Co., Chicago, involving 10,000 tons, and a plant for the Public Service Corp., Newark, N. J., for which 9800 tons has been placed.

Bridge work appeared well in excess of the year before. Railroads were more active, and states and municipalities were larger buyers. The predominant project was the Jersey Central bridge over Newark Bay, Jersey City, calling for approximately 50,000 tons, of which 21,000 tons was bought.

Ford Motor Co., Detroit, besides placing heavy tonnages was in the market several times for 25,000 tons and figured on large amounts for other projects.

The year was marked by fairly stable plain material prices.

On the bulk of tonnage placed where Pittsburgh base was used, prices increased during the first four months from 2.00c, the highest price in 1922, to 2.50c, where it has remained. Chicago prices approximated them closely.

Early in the year better prices were done in the form of premiums. In March and April, prices as high as 2.75c, Pittsburgh, were not uncommon, as high as 3.00c being reported. In the last half concessions were noted, some smaller mills shading 2.50c, Pittsburgh, as much as 10 points, but this business was light.

Steadiness of price continued in the face of lighter buying prevailing over much of the last half. By the end of February leading mills were booked well into the second quarter; a month

later, the majority were sold up over the first half, and one mill well beyond.

In no month did business approach the dullness recorded in recent years. The dullest period was October, but then so much business was in prospect that the market in most centers was stronger than in months preceding.

The most pronounced drop was in May. The sharp decline then appeared to be due more to other causes than general conservatism. Foremost factor was congestion prevailing at mills and fabricating shops, where for several weeks a labor shortage existed. This was so pronounced that late in April an eastern railroad bought from warehouse 2500 tons of shapes for quick delivery. The rapid increase in cost of building materials was also a deterrent. Wage controversies were a factor but in most cases the trouble was shortlived.

Awards since December, 1919, were:

	1923	1922	1921	1920
Jan.	173,294	72,100	32,000	135,000
Feb	184,887	78,700	25,600	171,000
March ..	220,400	139,300	52,300	150,400
April	186,117	200,968	55,900	122,250
May	131,875	185,065	50,800	110,700
June	118,117	168,894	66,900	90,400
July	117,563	158,012	60,200	90,400
Aug.	134,431	156,559	59,000	72,000
Sept.	121,045	146,827	86,000	77,400
Oct.	107,797	133,037	97,800	45,600
Nov.	.....	112,367	99,800	49,200
Dec.	.....	138,737	71,500	47,000
Total ..	1,495,526*	1,690,566	759,100	1,161,359

*Eleven months.

Heavy Bar Demand Keeps Mills Busy

OPENING 1923 with the holiday season bringing no seasonal falling off in demand, the soft steel bar market had every sign of strength. Large bookings were carried over from 1922 and much unsatisfied demand was backed up for late orders. Many mills were covered for full production during first quarter and some refused to book further orders. Deliveries averaged three months. An unusual feature was the heavy percentage of specifications.

With agricultural implement and automotive interests large users and railroad car builders seeking material it was natural that heaviest demand should come from the West. Within the first 60 days difficulty developed in placing orders and at times the tonnage refused by mills was fully equal to bookings. Demand for further contracts continued until June when conservatism appeared and for the first time demand was less than production.

While inquiry fell off and remained smaller than before, there was no less demand for shipment and users continued to press for delivery. Production was increased by practically all mills as the year advanced and in some cases close to capacity was attained. Additional steel thus made available was absorbed promptly and did not ease the situation.

Prices advanced from 2.00c, Pittsburgh and Chicago, at the opening of the year, to 2.40c, Pittsburgh, and 2.50c, Chicago, in April, the latter continuing through the year. During the period of most pressure for contracts premiums of $2 per ton were taken by independent producers generally, and at one time some makers were able to obtain up to $15 premium for immediate delivery. Some concern was expressed by conservative sellers at this situation, but it did not last long and produced no effect.

A new card of extras was put into effect July 5, increasing prices $1 to $20 per ton and correcting inequalities that had grown up through several years.

Iron bars did not follow a parallel course and through much of the year producers had little business, production being interrupted at times by lack of orders. In April slow delivery of steel bars caused larger buying of iron bars and delivery was advanced, but by June demand had lessened, conditions were listless and mills ran at a low rate. Prices varied little, advancing about $5 per ton from the beginning to the highest point in April and May and losing practically all this advance by the close.

Cold drawn bars followed much the same course as soft steel bars, entering the year with strong demand and much buying, advances being made to the middle of the year, aggregating about $12. Later the price declined $5 per ton. Higher prices did not check early buying and premiums were paid for delivery. In April more business was offered than makers could take.

Rail steel bars were in small demand. Except for some reinforcing bar demand when soft steel was not available, sellers were unable to accumulate much business. Though demand picked up in second quarter it did not continue and later months offered small business. One cause of slack demand was the slow position of agricultural implement makers, who normally use considerable of this material.

Bolt and nut makers had good business during first half, inquiry being turned down early and buying in the final third being hand-to-mouth. Prices were advanced 5 to 10 per cent on bolts and nuts, but rivets were somewhat dull. Covering for first quarter of 1924 was late and lacked enthusiasm.

Much the same course was followed by consumers of hoops and bands as in the case of other bar mill products. Demand increased steadily to an apex in April, with heavy bookings and advance in price, until producers would accept no more tonnage. In fourth quarter demand was dull and few users were active.

Cast Pipe Bought Freely to Capacity

CAST iron pipe makers found the past year peculiar in that from the first month to the close they had plenty of business and yet there was an apparent dearth of formal inquiry most of the time. The winter had seen unusual demand and the year started with shop books well filled and plenty of business in sight, the most active and auspicious beginning in many years. Even before the usual active season was at hand makers had declined to quote on much of the inquiry and confined their selling to a considerable degree to meet needs of regular customers. By February small sizes had been sold for several months ahead though there was room for larger pipe. For the remainder of the year makers found plenty of tonnage to keep their books filled, coming from quiet buying without bidding. In fact, most public lettings were met by figures from only a few makers, and prices were purposely high on the part of some to avoid taking the business. By the middle of the year sales entirely without bids were in volume equal to production and there was no need to seek tonnage. Shops were behind delivery requirements most of the time and buyers urged quicker shipments

that their construction programs might be expedited. By August the best delivery possible on new business was November and December and small sizes were sold for the year. During fourth quarter, cities were active in covering large tonnages for 1924 and considerable tonnage was covered for that delivery. The year closed with shop books well filled and all makers busy on orders, quiet buying continuing and prices well maintained except for occasional concessions on larger sizes to balance production. Quotations advanced $6 to $8 per ton during the year on heavy demand and high cost of production, makers confining sales to regular buyers.

Sheet Buying Heavy, Taxing Capacity

HEAVY consumption of sheets was a feature of the 1923 market. Either a feast or a famine of orders met independent manufacturers and created contrast between their condition and that of the American Sheet & Tin Plate Co. The latter maintained a backlog and in the early part of the year this was three to five months' business when about 85 per cent was actual specifications. The greatest period of activity was in March, as shown by the accompanying table which represents the condition of independent manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers, giving percentages of capacities:

	Sales	Production	Shipments
Jan	89.2	92	87.7
Feb.	94.7	89	81.5
March	108	92.7	95.3
April	65.6	90.9	90.5
May	82.7	88.6	94.7
June	63.1	79.9	85.3
July	34.5	65.3	71.8
Aug.	39.9	80.1	80.2
Sept.	86.2	71.5	79.3
Oct.	62.8	76.6	78.3
Nov.	*60	*74	*75
Dec.	*61	*72	*76

*Estimated.

Price fluctuations were more prevalent in first than last half. The figures reaffirmed Nov. 23, 1922 by the American Sheet & Tin Plate Co. for first quarter of 1923, namely 2.50c, 3.35c, 4.35c and 4.70c for blue annealed, black, galvanized and full-finished automobile sheets respectively, represented the nominal first quarter market since independents were able to obtain figures much in advance. Early in February the leading interst reaffirmed those levels for second quarter but Feb. 26 advanced blue annealed and black $3 per ton, galvanized $5 per ton, and full-finished $6 per ton. This advance was nominal because it had nothing to offer for delivery in second quarter but served to indicate the trend for third quarter.

During first quarter, particularly in March and to a certain extent into second quarter, independents' prices varied widely from those of the leading interest. At one time in March blue annealed was sold by independents at $12 per ton above the American company's figure of 2.65c. Against the leading interest's figure of 5.35c on full-finished sheets in April, some premium prices of 7.00c were obtained. By May, prices of independent manufacturers, due to reduced demands of consumers, commenced to seek the Steel corporation's levels, and in third and fourth quarter concessions of $2 to $3 per ton commenced to appear, first on black and then on galvanized. These were followed in October by prices on blue annealed $2 per ton under the American February one or two independent manufacturers inaugurated two separate bases on blue annealed sheets, one for 12-gage and heavier, 2.75c; and one for 13-gage and lighter, 2.90c. By May, these had advanced to 3.00c and 3.25c, but by July this practice had practically ceased and a 3.00c base was quoted which prevailed until concessions of $2 per ton appeared in November and early December. The general market at the end of the year was 3.00c, Pittsburgh.

In the early part of March due to the occupation of the Ruhr district by France there were numerous requests for spot tonnages. In the latter part of the third quarter heavy demand commenced to appear from needs of Japan following its earthquake. In excess of 150,000 tons were distributed in this country, mainly black. Extremely thin gages were wanted in inquiries in lots of 1000 to 10,000 tons of 36 by 72-inch sheets. Japanese buyers were prevailed upon to accept 28 to 30-gage material instead of 30½ and 31-gage. Because the selling prices were somewhat in advance of the domestic market price on the same material the business was considered exceedingly desirable. One order was placed by the Japanese embassy at Washington with the American Sheet & Tin Plate Co. in November, and involved 13,000 tons of black, and 3500 tons each of galvanized plain and galvanized corrugated sheets.

Record Made in Year's Tin Plate Selling

ENERGETIC effort by tin plate manufacturers to supply can-makers and other consumers of tin plate so that production for the year was brought to a new high total, was a noteworthy feature of the past year. High operating rates were the rule except during the spring and summer when the usual labor exodus from the hot mills took place and when a tin bar shortage appeared. It is estimated the year's production was at least 37,500,000 base boxes and consumption approximated some such figure, making it a banner year for both production and consumption. Shipments were high through the 10 months starting in March and in the first half the American Sheet & Tin Plate Co. shipped more tin plate by 2 or 3 per cent than in any corresponding period in its history.

The official $4.75 price, reached Nov. 3, 1921, and reaffirmed Nov. 23, 1922 by the American Sheet & Tin Plate Co. as its level for first quarter and first half of 1923, held until Feb. 26. The leading interest then increased to $4.95, several independents having reached $5 the previous week. The wage advance of April increased the cost of making tin plate approximately 15 cents per base box and another factor was the high price on pig tin. Early in March the Wheeling interest announced a $5.50 price and a Weirton maker and other independents quoted $5.25 to $6 late in March or early in April. April 26 the American company announced $11 per ton over its $4.95 price, or $15 over its announced $4.75 price for the first half, naming $5.50 for third quarter which was reaffirmed Sept. 6 for fourth quarter and again named Nov. 1 for first quarter.

The American company was well booked in advance through the year and its effort was allocation rather than selling. On opening its books for fourth quarter it had only about seven weeks' output to sell. In six days from Nov. 1 it disposed of 400,000 tons for delivery in 1924, so that the year ended with first half output fully obligated. Independents were well booked ahead, usually 45 to 90 days,

Strong Year in Metal Market

Peacetime Accomplishments Exceeded in All Departments—Foreign Situation Influenced Course of Prices—Wide Range of Prices Marks Course of Market—Tin Followed Usual Erratic Course with Heavy American Consumption

PRODUCTION and consumption of the principal nonferrous metals in the United States in 1923 broke all peacetime records. A larger part of the increased wartime capacity for producing and fabricating metals was engaged for a longer period than had been thought possible a year or two ago. The metal business, however, was highly competitive through the year, with most lines conducted on a narrow margin of profit.

Prominent among all the factors exerting a metal market influence this year were two dominant conditions. One of these was the attitude of buyers in this country after the third week in March, when rumors were circulatetd that the federal reserve board might increase rediscount rates in order to check possible inflation. Bearing freshly in mind the 1920 debacle, manufacturing consumers of materials pursued a conservative buying policy from the beginning of April and the record of prices for metals shows the deflationary effect of the March warning. While the policy of buyers frequently was irritating to sellers, it resulted in preventing the accumulation of unwieldy invisible supplies of metals and enabled the metal markets to enter 1924 in a splendid statistical position.

The other strong influence has been the economic and political situation abroad. Due to the close relationship of the international metal markets, our metal business has been sensitive to the changing political outlook in Europe. Several important movements in the copper market took place coincident with changes or hoped-for changes in the European outlook.

The copper market swung within a rather wide range this year, reaching 17.50c late in March and declining with only occasional slight recoveries, to a low of 12.50c in October. Thence it recovered in November to 13.50c, remaining slightly above 13c through the first half of December. The copper industry has faced the problem of heavy supplies with an uncertain foreign market, but unsold stocks of copper actually are no larger at the close of 1923 than at the close of 1922. New supplies of copper this year, including imports, have reached 107,000 tons monthly, against 80,000 tons in the closing months of 1922 and 30,000 tons in the closing months of 1922.

The market for prime western zinc has ranged between a high of 8c, East St. Louis, in March, and a low of 5.75c in July. Consumption of zinc in this country approximated 500,000 tons in 1923, by far the largest consumption year on record. Production similarly was heavy, but decreased appreciably in the latter months of the year. Exports of zinc the first nine months totaled about 36,000 tons.

Lead prices ranged between 8.62½c, New York, in March, and 6c in July. Consumption of lead was well maintained through the year. Early in 1923 the absorption of lead was so heavy here that lead produced in Spain and other continental countries was profitably sold here, despite the duty of 2⅛c, plus transportation costs. Later in the year the New York market was lower in relation to the London market and at times American consumers depended solely upon American production, but at almost all times Mexican ores, carrying 1½c duty on the lead content, were entered for consumption here. Consumption by the paint, lead covered vable and storage battery trades was heavy.

The tin market, as usual, pursued an erratic course, ranging between 51.25c for spot Straits in March and 37.50c in July. The heavy consumption of tin by American industry was the dominant factor in the world tin market, being sufficiently large to enable Far Eastern holders of pooled tin to dispose of about 7000 tons above current production in the eight months from March to October. World visible supplies of tin decreased 5500 tons between Dec. 31 and Oct. 31, to about 19,500 tons on the latter date.

The aluminum market was strong and active most of the year. The domestic producer opened the year with a quotation of 24c for 98 to 99 per cent virgin ingot, advancing to 25c in March and to 26c in November. Early in the year outside holders were sellers at a concession, but later an appearance of shortage existed and outside holders thenceforth were frequently able to command premiums.

The market for Chinese antimony opened the year at 6.25c, duty paid, for spot, reached 9.12½c in March, then reacted to 6.75c in June and recovered to 9.25c in November, again reacting. Political conditions in China, interfering with shipments of antimony from interior smelters to the coast have had some influence on the market.

Nickel prices were revised downward early in January 1923, by the leading sellers and subsequently have held within the same general levels, 32c for electrolytic, 27c to 29c for shot and ingot.

Rapid expansion of the electric industry continues to be one of the greatest factors in metals, especially in lead and copper. These two metals also were consumed in tremendous tonnages this past year in the building of automobiles and homes. The construction of these two products has in addition taken a large amount of brass from the foundries and rolling mills. The brass and wire mills were rushed to capacity during the year.

Average Monthly Nonferrous Prices in 1923

Prompt, wholesale lots, cents per pound

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.
Tin, spot straits, New York	39.18	42.00	48.55	45.89	43.12	40.55	38.49	39.34	41.66	41.88	44.06	47.87
Electrolytic copper, delivered	14.78	15.62	17.13	17.06	15.90	15.01	14.60	14.90	13.60	12.85	13.07	13.20
Lead, New York, outside	7.84	8.18	8.41	8.20	7.37	7.17	6.31	6.75	7.03	6.88	6.91	7.60
Zinc, prime Western, East St. Louis	6.95	7.26	7.87	7.32	6.69	6.04	6.08	6.33	6.46	6.30	6.38	6.30
Aluminum, outside 98-99%	22.80	23.52	25.40	26.50	26.07	26.00	26.00	25.82	25.00	25.00	25.55	26.40
Antimony, spot	6.78	7.20	8.70	8.42	7.44	6.86	7.09	7.66	7.66	7.85	9.05	8.75

Market History Told by Prices

Ores and Alloys

Spiegeleisen, 1915-1923

At Producers' Furnaces

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$34.90	$35.75	$37.25	$39.25	$43.00	$46.00	$45.00	$45.00	$43.50	$40.00	$39.00	$39.00
1922.....	25.50	28.00	28.00	30.00	35.00	35.25	35.00	37.00	38.00	37.75	36.80	35.50
1921.....	46.25	37.75	34.20	32.00	31.75	29.60	27.50	26.20	25.25	24.85	25.00	25.00
1920.....	46.60	57.60	60.40	66.85	75.00	75.00	75.00	79.35	82.00	80.00	74.35	57.90
1919.....	*67.50	*52.50	*42.50	*34.50	*31.35	*27.50	34.00	34.00	34.00	34.00	34.00	39.00
1918.....	59.00	59.00	65.50	*70.00	*71.00	*75.00	*75.00	*75.00	*75.00	*75.00	*75.00	*72.50
1917.....	57.50	66.25	77.50	76.75	78.00	83.00	85.00	81.25	80.50	73.50	63.25	60.00
1916.....	32.50	42.50	55.00	60.00	60.00	55.00	47.50	47.50	45.00	40.00	45.00	50.00
1915.....	25.00	25.50	26.00	26.00	26.00	26.00	26.00	26.00	29.00	30.00	30.00	30.00

* Prices from and including April, 1918, and to and including June, 1919, are for 16 per cent spiegeleisen. All other prices apply to 20 per cent metal.

Ferrosilicon, 10 Per Cent, 1916-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$44.50	$45.50	$47.10	$48.50	$48.50	$48.00	$46.50	$43.50	$43.50	$43.50	$41.50	$41.50
1922.....	38.50	37.50	36.50	37.25	40.50	41.50	41.50	42.50	48.50	50.00	48.00	44.50
1921.....	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	52.50	57.50
1920.....	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50	82.50
1919.....	54.00	54.00	52.95	47.40	45.00	47.40	49.75	49.75	49.75	49.75	54.75	58.50
1918.....	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	55.00	57.00	57 00	57.00
1917.....	42.00	42.00	49.80	57.00	67.00	82.50	92.25	95.00	95.00	80.00	55.00	55.00
1916.....	28.00	28.00	31.00	31.00	32.00	32.00	32.00	31.80	30.25	30.50	34.60	42.00

Ferrosilicon, 50 Per Cent, 1916-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$85.00	$90.00	$92.50	$95.00	$95.00	$87.50	$82.50	$82.50	$82.50	$82.50	$80.00	$75.00
1922.....	57.50	55.00	54.00	55.00	57.50	57.50	55.00	55.00	55.00	70.00	82.50	82.50
1921.....	80.00	92.00	93.00	90.00	80.00	75.00	75.00	65.00	65.00	60.00	60.00	57.00
1920.....	82.00	80.00	83.00	80.00	83.00	82.50	82.50	80.00	82.50	82.50	80.00	80.00
1919.....	145.00	125.00	115.00	110.00	100.00	85.00	80.00	78.00	80.00	85.00	80.00	80.00
1918.....	175.00	175.00	177.50	172.50	170.00	170.00	165.00	153.50	150.00	151.00	150.00	150.00
1917.....	122.50	156.25	175.00	187.50	230.00	230.00	237.50	225.00	212.50	171.25	157.50	172.50
1916.....	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	94.25	95.00	95.00

Ferrochrome, 4-6 Per Cent, 1918-1923

Per Pound of Metallic Chromium Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	12.50c	12.00c	12.00c	12.00c	12.00c	12.00c	12.00c	12.00c	12.00c	12.00c	12.00c	12.00c
1922.....	14.50	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	13.00	13.50	13.50
1921.....	17.50	17.25	17.25	16.25	16.00	15.00	15.00	14.00	14.50	14.50	14.50	14.50
1920.....	22.50	19.50	19.50	19.50	18.50	18.50	21.50	20.00	18.50	18.50	18.50	18.50
1919.....	41.00	32.50	31.00	31.00	32.00	32.00	32.00	32.00	29.00	29.00	28.00	28.00
1918.....	.....	.....	.....	.....	.....	.....	44.00	41.00	41.00	41.00	41.00	41.00

Ferrotungsten, 1918-1923

Per Pound of Metallic Tungsten Contained

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$0.87	$0.87	$0.89	$0.90	$0.92	$0.92	$0.95	$0.88	$0.87	$0.87	$0.87	$0.87
1922.....	0.42	0.37	0.42	0.42	0 42	0.42	0.42	0.42	0.42	0.85	0.92	0.92
1921.....	0.65	0.57	0.57	0.47	0.47	0.50	0.50	0.47	0.36	0.36	0.36	0.36
1920.....	1.05	1.05	1.00	1.00	1.05	1.07	1.12	1.10	1.10	0.95	0.95	0.95
1919.....	2.35	2.15	2.07	1.75	1.40	1.32	1.30	1.22	1.25	1.25	1.20	1.15
1918.....	1.95	2.72	1.98	2.32	2.26	2.23	2.25	2.32	2.32	2.55	2.65	2.45

Ferromanganese, Pittsburgh, 1914-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$109.79	$112.29	$120.79	$124.79	$129.79	$129.79	$122.29	$122.29	$114.79	$112.79	$113.79	$113.79
1922.....	16.90	65.32	67.82	69.07	72.32	72.82	72.29	72.29	†80.59	105.47	104.92	104.92
1921.....	101.00	96.85	89.00	87.50	83.00	76.50	75.00	70.75	64.75	61.65	60.00	60.00
1920.....	146.00	160.00	172.00	200.00	200.00	198.00	190.00	193.75	172.40	156.40	153.00	120.00
1919.....	*212.50	165.00	134.00	113.75	110.00	111.75	111.00	110.00	105.00	110.00	110 00	121.00
1918.....	250.00	250.00	250.00	250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*250.00	*236.00
1917.....	175.00	192.50	212.50	250.00	375.00	400.00	400.00	387.50	380.00	300.00	247.50	242.50
**1916.....	139.88	215.13	334.75	412.50	347.75	244.88	198.75	173.18	167.67	160.00	155.00	162.50
1915.....	68.00	78.80	95.00	95.00	97.00	105.00	103.57	101.36	110.00	109.64	100.42	103.04
1914.....	43.57	39.01	39.02	38.68	38.16	38.00	37.54	102.08	93.45	70.80	67.85	68.00

* Prices from May, 1918, to January, 1919, inclusive, were based on 70 per cent ferromanganese. All other prices in above table were based on 80 per cent metal.

† Duty of 1⅜ cents per pound contained manganese became effective on ferromanganese Sept. 21.

** Quotations seaboard to Jan., 1917, delivered Pittsburgh thereafter.

Manganese Ore, 1915-1925

Dollars Per Gross Ton. 50 Per Cent Ore

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$18.25	$18.25	$20.50	$22.00	$21.50	$21.75	$21.75	$21.75	$20.50	$20.50	$20.50	$20.50
1922.....	10.50	11.00	12.50	12.75	12:75	13.25	13.50	13.75	*14.35	25.50	25.50	25.50
1921.....	18.75	17.50	17.25	14.00	14.00	12.50	12.50	12.50	12.50	12.50	12.50	12.00
1920.....	30.00	38.75	38.75	32.25	35.00	37.50	42.25	35.00	35.00	32.75	25.00	21.25
1919.....	55.50	38.75	37.50	30.00	30.00	30.00	31.25	31.25	30.00	27.50	27.50	27.50
1918.....	63.75	63.75	60.00	65.00	65.00	65.00	68.50	65.00	65.00	65.00	62.50	55.00
1917.....	30.00	30.00	40.00	40.00	50.00	50.00	50.00	50.00	60.00	60.00	60.00	60.00
1916.....	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	30.00	30.00	30.00	30.00
1915.....	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	22.50	22.50	22.50	22.50

* After Sept., 1922, duty 1c per pound metallic content, $11.20 per gross ton 50 per cent ore.

Market History —

Pig Iron

Per Gross Ton

Basic, Pittsburgh, 1908-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$27.67	$27.87	$31.57	$32.77	$31.57	$29.12	$26.92	$26.77	$26.77	$25.52	$22.57	$22.77
1922.....	20.31	19.81	19.86	22.21	26.46	26.96	26.76	27.96	34.27	32.37	29.77	26.77
1921.....	31.46	28.71	26.56	24.81	23.96	23.16	20.81	20.96	21.56	21.16	20.96	20.71
1920.....	39.20	43.65	44.40	44.40	44.65	45.15	47.40	49.40	50.45	47.21	39.46	34.96
1919.....	31.00	31.40	30.35	27.15	27.15	27.15	27.15	27.15	27.15	27.15	30.40	35.40
1918.....	33.95	33.95	33.95	32.95	32.95	33.20	33.40	33.40	33.40	43.40	34.40	34.40
1917.....	30.95	30.95	32.85	39.20	42.14	50.20	53.20	52.75	43.95	33.95	33.95	33.95
1916.....	19.20	18.77	19.20	19.20	18.95	18.95	18.95	18.95	19.08	20.83	25.95	30.95
1915.....	13.45	13.45	13.45	13.45	13.45	13.54	13.83	14.89	15.65	15.95	16.70	18.55
1914.....	13.42	14.09	13.96	13.90	13.90	13.90	13.90	13.90	13.90	13.75	13.45	13.45
1913.....	17.40	17.29	17.03	16.77	16.15	15.46	15.25	15.07	15.09	14.85	14.09	13.65
1912.....	13.28	13.30	13.44	14.00	13.00	13.40	14.40	14.85	15.33	16.95	17.12	17.40
1911.....	14.40	14.46	14.46	14.46	14.32	14.12	13.77	13.90	13.70	13.42	13.37	13.26
1910.....	17.90	17.77	17.20	16.65	16.20	15.70	15.27	14.95	14.70	13.96	14.28	14.20
1909.....	16.75	16.50	16.00	15.75	15.00	15.50	15.75	17.00	18.00	18.50	18.50	18.75
1908.....	17.25	16.90	16.90	16.50	16.40	16.25	16.00	15.90	15.50	15.10	16.40	16.40

Bessemer, Pittsburgh, 1895-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$29.27	$29.57	$31.67	$32.77	$32.07	$30.27	$28.52	$28.07	$28.27	$27.27	$25.47	$24.27
1922.....	21.51	21.31	21.21	22.46	26.46	26.96	26.76	29.16	35.27	35.12	27.77	30.33
1921.....	33.96	30.96	28.96	27.46	26.06	25.06	22.96	21.96	22.46	22.06	21.96	21.96
1920.....	40.00	43.15	43.40	43.50	43.90	44.25	46.80	49.50	50.45	50.17	42.33	36.96
1919.....	33.60	33.60	32.55	29.35	29.35	29.35	29.35	29.35	29.35	29.35	32.00	36.65
1918.....	37.25	37.25	37.25	36.15	36.15	36.40	36.60	36.60	36.60	36.60	36.60	36.60
1917.....	35.95	35.95	37.45	42.20	44.95	55.20	57.95	55.55	48.27	37.25	37.25	37.25
1916.....	21.32	21.45	21.55	21.95	21.95	21.95	21.95	21.95	22.20	24.33	30.35	35.95
1915.....	14.70	14.63	14.55	14.55	14.55	14.58	14.88	15.89	16.80	16.95	17.45	19.70
1914.....	15.00	15.09	15.15	14.90	14.90	14.90	14.90	14.90	14.90	14.85	14.70	14.70
1913.....	18.15	18.15	18.15	17.90	17.90	17.26	16.65	16.52	16.65	16.60	16.09	15.90
1912.....	15.15	15.00	15.02	15.15	15.15	15.15	15.15	15.43	15.93	17.75	18.05	18.15
1911.....	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.90	15.39	15.10	15.15
1910.....	19.90	19.42	18.90	18.15	17.09	16.73	16.40	16.21	15.90	15.90	15.90	15.90
1909.....	17.34	16.78	16.34	15.80	15.48	16.13	16.37	17.13	18.33	19.68	19.80	19.90
1908.....	19.00	17.90	17.86	17.49	16.92	16.90	16.73	16.11	15.90	15.48	16.74	17.40
1907.....	22.92	22.78	22.85	22.16	24.10	24.10	23.30	22.90	22.90	22.80	20.60	19.90
1906.....	17.32	17.29	17.26	17.25	17.24	17.38	17.57	17.96	18.44	20.06	21.96	22.75
1905.....	16.85	16.45	16.35	16.30	16.20	15.65	15.00	15.40	15.90	16.50	17.70	18.10
1904.....	13.60	13.35	13.85	14.10	13.60	12.60	12.50	12.65	12.75	13.35	15.25	16.60
1903.....	22.35	22.35	22.00	21.60	20.00	19.85	19.00	17.85	16.35	15.85	15.25	14.35
1902.....	16.70	16.93	17.56	18.37	20.95	21.25	22.00	21.75	21.75	21.95	22.25	22.12
1901.....	13.25	13.60	16.56	16.69	16.65	15.94	16.00	15.90	15.71	15.90	16.10	16.35
1900.....	24.90	24.90	24.90	24.90	24.90	19.75	18.00	16.05	14.00	13.25	13.65	13.55
1899.....	11.00	11.75	14.00	15.15	16.25	19.00	20.75	22.00	23.50	24.00	24.50	25.00
1898.....	9.90	10.15	10.40	10.50	10.50	10.40	10.35	10.40	10.40	10.30	10.20	10.65
1897.....	10.50	10.65	10.50	10.00	9.35	9.35	9.00	9.05	10.00	10.25	10.25	9.90
1896.....	12.30	12.80	12.00	13.15	12.75	12.40	12.20	11.45	11.25	11.50	12.30	11.40
1895.....	10.00	10.15	10.25	10.75	11.25	12.00	14.00	14.75	17.25	15.75	14.00	12.25

No. 2 Foundry, Valley, 1904-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$27.00	$27.00	$29.60	$31.00	$30.15	$27.75	$25.60	$24.70	$24.75	$23.40	$22.00	$22.00
1922.....	20.05	19.20	19.20	20.55	23.95	24.20	24.20	31.00	35.25	31.85	28.40	25.00
1921.....	31.10	28.20	26.20	25.05	23.80	22.50	20.30	20.10	21.20	21.20	20.05	20.35
1920.....	40.90	42.40	43.40	44.20	45.40	45.40	46.40	49.65	50.95	48.95	42.95	37.20
1919.....	31.00	31.00	29.10	26.75	26.75	28.15	28.15	28.15	29.50	34.95	33.35	38.15
1918.....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917.....	32.35	34.25	37.20	39.90	42.95	51.40	55.90	54.70	49.05	33.00	33.00	33.00
1916.....	18.90	18.75	18.75	18.90	18.70	18.50	18.50	18.50	18.65	20.75	26.10	31.30
1915.....	13.25	13.25	13.25	12.95	12.75	12.75	12.85	13.95	14.75	14.85	15.90	17.50
1914.....	12.89	13.25	13.40	13.50	13.50	13.50	13.50	13.30	13.25	13.10	12.90	13.05
1913.....	17.50	17.30	16.75	15.80	14.80	14.15	13.85	13.80	14.00	13.90	13.90	13.50
1912.....	13.00	13.10	13.20	13.35	13.30	13.30	13.50	13.85	14.50	16.15	17.30	17.50
1911.....	13.75	13.75	13.85	13.85	14.75	13.60	13.50	13.50	13.50	13.50	13.15	12.80
1910.....	17.00	16.55	16.10	15.75	15.35	14.65	14.20	14.10	14.40	13.95	13.75	13.75
1909.....	15.35	15.00	14.85	14.25	14.35	14.85	15.25	15.35	16.25	17.10	17.25	17.25
1908.....	16.35	16.00	15.70	15.10	14.50	15.35	15.10	15.00	14.60	14.20	15.50	15.50
1907.....	23.30	24.00	24.00	24.00	24.50	24.50	23.15	22.55	21.30	20.05	19.15	17.05
1906.....	17.55	17.25	17.15	16.75	16.65	16.25	16.50	18.00	19.00	20.50	23.00	23.75
1905.....	16.50	16.15	16.00	16.15	15.75	14.35	14.35	14.55	14.75	15.65	16.85	17.25
1904.....	12.50	12.25	13.00	12.90	12.15	11.65	11.50	11.65	11.75	12.40	15.00	16.00

Malleable, Valley, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$27.25	$27.25	$29.20	$31.00	$30.20	$28.25	$25.50	$24.70	$24.60	$23.25	$20.40	$22.00
1922.....	19.45	19.00	19.00	20.40	24.60	24.50	25.00	28.60	34.00	32.30	29.25	26.25
1921.....	32.25	28.75	26.40	24.90	23.75	22.60	20.40	20.00	20.40	20.20	20.00	20.00
1920.....	38.95	41.60	42.35	41.60	41.60	41.85	43.40	48.25	50.50	48.25	40.40	36.00
1919.....	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	27.75	31.75	36.40
1918.....	33.50	33.50	34.45	34.45	34.45	34.65	34.90	34.90	34.90	34.50	34.50	34.50
1917.....	31.00	33.50	36.00	39.00	42.70	50.10	53.00	54.00	49.60	34.25	33.50	33.50
1916.....	19.00	18.65	18.50	18.50	18.50	18.50	18.50	18.50	18.55	20.15	25.85	30.75
1915.....	12.75	12.75	12.85	12.50	12.50	12.50	12.65	13.75	14.50	14.60	15.50	17.90
1914.....	13.15	13.19	14.15	13.25	13.25	13.00	13.00	13.00	13.00	12.90	12.75	12.75
1913.....	17.25	17.20	16.75	15.75	14.85	14.40	14.15	14.00	14.05	14.25	13.85	13.50

Market History —

No. 2 Foundry, Chicago, 1895-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$28.80	$29.75	$31.25	$32.50	$32.50	$31.25	$28.00	$27.10	$26.75	$25.60	$23.30	$23.00
1922.....	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.00
1921.....	32.75	28.65	25.80	24.25	23.00	21.10	19.15	19.60	21.75	21.50	21.00	20.00
1920.....	40.00	42.25	43.00	43.00	43.00	43.00	44.40	46.00	46.00	46.00	42.40	36.50
1919.....	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	31.75	31.75	38.30
1918.....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917.....	30.00	31.25	35.70	39.25	43.20	51.00	55.00	55.00	49.50	33.00	33.00	33.00
1916.....	18.50	18.50	18.70	19.00	19.00	19.00	19.00	19.00	18.65	19.15	25.00	29.25
1915.....	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	13.80	14.45	17.10	18.00
1914.....	14.25	14.20	14.25	14.25	14.25	14.20	14.00	14.00	13.65	13.30	13.00	13.00
1913.....	18.00	18.00	17.60	17.25	16.70	16.10	15.20	15.00	15.00	15.00	15.00	14.50
1912.....	14.00	14.00	14.00	14.25	14.50	14.50	14.60	15.30	16.35	17.30	17.85	18.00
1911.....	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.50	14.50	14.50	14.00	14.00
1910.....	19.00	18.75	18.25	17.00	16.75	16.50	16.50	16.50	16.50	16.00	16.00	16.00
1909.....	17.45	16.75	16.50	16.45	16.20	16.40	16.90	17.35	18.20	18.85	19.00	19.00
1908.....	18.25	17.85	17.40	17.20	17.00	17.30	17.00	17.00	16.75	16.50	16.75	17.35
1907.....	26.00	26.50	26.75	27.50	27.40	26.50	25.40	24.50	23.60	22.60	20.60	19.00
1906.....	19.25	19.25	19.00	18.75	18.50	18.10	18.30	18.90	19.75	21.50	26.50	27.00
1905.....	17.50	17.50	17.50	17.50	17.25	16.60	16.15	16.35	16.50	17.55	18.90	19.50
1904.....	14.10	13.75	13.55	14.00	13.80	13.40	13.30	13.35	13.40	13.70	15.60	16.60
1903.....	25.00	24.00	24.00	23.00	21.70	20.50	18.50	17.50	16.85	15.90	14.50	14.30
1902.....	15.80	16.75	18.60	19.75	21.75	22.50	23.40	24.65	27.15	27.15	26.90	25.40
1901.....	14.60	14.10	15.20	15.50	15.50	15.50	15.50	15.20	15.00	15.00	15.00	15.50
1900.....	24.50	24.50	23.75	23.25	22.00	20.25	17.75	15.50	14.50	14.00	14.25	14.60
1899.....	11.25	12.00	14.25	15.00	15.25	17.00	17.00	20.00	22.00	23.00	23.50	24.50
1898.....	10.50	10.50	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
1897.....	11.00	10.75	10.75	10.75	10.25	10.00	10.00	10.00	10.25	10.75	10.75	10.50
1896.....	13.50	12.25	12.00	12.00	11.75	11.25	11.25	11.20	10.80	10.75	11.10	11.25
1895.....	9.75	9.75	9.75	10.00	10.25	10.75	12.50	13.50	13.50	14.50	14.50	14.00

Malleable, Chicago, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$28.80	$29.75	$31.25	$32.50	$32.50	$31.25	$28.00	$27.10	$26.75	$25.60	$23.30	$23.00
1922.....	19.00	18.90	20.00	20.50	22.60	23.25	24.65	28.60	32.00	31.75	30.60	28.25
1921.....	33.25	29.00	26.25	24.75	23.50	21.20	19.15	19.40	21.75	21.20	21.00	20.00
1920.....	40.50	42.75	43.50	43.50	43.50	43.50	44.90	46.50	46.50	46.50	43.00	37.50
1919.....	31.50	31.50	30.45	27.25	27.25	27.25	27.25	27.25	27.25	28.00	32.25	38.80
1918.....	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	34.50	34.50	34.50
1917.....	30.00	31.25	35.80	39.00	43.20	50.50	55.00	55.00	49.50	33.35	33.50	33.50
1916.....	19.00	19.00	19.00	19.50	19.50	19.50	19.50	19.50	19.15	19.50	25.00	29.25
1915.....	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.40	14.20	15.10	17.40	18.00
1914.....	14.25	14.25	14.25	14.25	14.25	14.25	14.00	14.00	13.50	13.50	13.00	13.00
1913.....	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	14.40

No. 2X Foundry, Philadelphia, 1910-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$29.56	$30.10	$32.00	$32.75	$32.75	$30.60	$28.00	$25.80	$26.20	$24.50	$23.00	$24.26
1922.....	21.75	21.35	21.25	23.75	25.60	27.20	27.90	32.15	34.25	33.00	30.50	28.76
1921.....	35.00	31.00	27.40	26.25	26.10	26.00	23.50	21.00	21.40	22.00	22.50	22.10
1920.....	43.90	45.00	45.68	46.80	46.90	46.90	48.55	50.95	53.75	52.65	46.75	38.95
1919.....	36.15	36.15	35.10	31.00	30.10	29.60	29.50	29.60	29.95	32.00	35.85	40.75
1918.....	34.25	34.25	34.25	34.25	34.25	34.25	34.50	34.50	34.50	38.85	39.15	39.15
1917.....	30.50	31.75	36.90	41.75	43.35	47.50	54.35	53.40	47.80	34.00	34.00	34.00
1916.....	19.75	20.00	20.00	20.75	20.50	19.75	19.75	19.75	19.75	20.50	25.25	30.00
1915.....	14.25	14.25	14.25	14.25	14.00	14.25	14.50	15.25	16.25	16.50	17.50	19.25
1914.....	14.75	15.00	15.00	15.00	14.75	14.75	14.75	14.75	14.75	14.50	14.25	14.25
1913.....	18.25	18.00	17.75	17.50	17.00	16.25	15.50	15.75	16.00	15.75	15.50	15.00
1912.....	15.00	15.00	15.00	15.25	15.25	15.50	15.75	16.00	16.50	17.50	18.00	18.25
1911.....	15.50	15.50	15.75	15.50	15.25	15.00	15.00	15.00	15.00	15.00	14.85	14.75
1910.....	19.00	18.40	18.25	17.75	17.25	16.75	16.00	16.00	16.00	15.75	15.50	15.50

Basic, Eastern Pennsylvania, 1909-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$27.70	$28.15	$29.35	$30.75	$30.75	$28.15	$27.25	$25.10	$25.10	$24.00	$22.60	$23.25
1922.....	20.25	19.85	19.90	21.70	24.55	25.25	26.00	29.50	30.00	30.25	28.00	27.65
1921.....	33.35	29.95	26.20	25.00	25.00	24.70	22.25	20.70	19.50	20.50	20.90	20.25
1920.....	39.75	40.50	43.00	43.70	44.00	44.05	44.10	47.45	51.15	50.75	44.55	34.75
1919.....	33.90	33.90	32.85	29.65	28.80	25.50	26.60	27.00	27.00	27.90	33.00	35.75
1918.....	33.90	33.90	33.90	32.90	32.90	32.90	32.90	32.90	32.90	36.60	36.90	36.90
1917.....	30.15	30.50	33.80	38.25	40.80	46.40	50.75	51.00	46.50	33.50	33.50	33.50
1916.....	19.50	19.50	20.00	20.50	20.00	19.25	19.00	19.25	20.00	21.00	25.50	30.50
1915.....	13.50	13.75	14.00	13.25	13.50	13.50	13.75	15.25	17.25	17.50	17.75	18.00
1914.....	14.00	14.25	14.25	14.25	14.00	14.00	14.00	14.00	14.00	14.00	13.50	13.50
1913.....	18.25	18.00	17.50	16.50	16.50	16.00	15.25	15.00	15.25	15.25	15.00	14.25
1912.....	14.25	14.25	14.25	15.00	15.00	15.25	15.50	16.25	16.50	17.50	18.00	18.25
1911.....	14.50	15.00	15.25	15.25	14.75	14.50	14.50	14.50	14.50	14.50	14.25	14.25
1910.....	18.75	18.50	18.00	17.50	16.25	15.75	15.50	15.00	15.00	14.50	14.50	14.50
1909.....	16.40	16.10	15.85	15.05	15.00	15.85	15.90	16.15	16.80	17.85	18.36	18.15

Standard Low Phosphorus, Eastern Pennsylvania, 1911-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$29.75	$31.35	$35.45	$35.45	$35.80	$34.80	$33.80	$32.80	$30.50	$30.50	$30.00	$29.50
1922.....	35.00	34.00	34.00	34.00	35.35	35.35	35.15	38.00	40.00	40.00	40.00	40.00
1921.....	47.70	46.80	46.80	44.15	43.30	43.30	43.30	43.30	43.30	43.30	43.30	35.30
1920.....	51.60	53.55	53.80	53.80	54.80	60.20	57.80	59.60	65.30	65.30	*65.30	*65.30
1919.....	51.00	51.00	49.90	46.75	45.80	42.25	41.10	40.25	40.25	40.35	43.00	47.50
1918.....	55.50	55.50	55.50	55.50	55.50	55.50	56.00	56.00	56.00	57.00	57.00	57.00
1917.....	54.50	57.50	66.70	75.50	77.00	85.00	92.50	92.50	82.00	55.50	55.50	55.50
1916.....	32.00	32.00	32.00	33.00	34.00	34.00	33.00	33.00	34.00	40.00	46.00	55.00
1915.....	19.00	19.00	20.00	20.00	20.00	20.50	21.50	23.50	24.50	28.00	30.00	32.00
1914.....	21.00	21.00	21.00	21.00	21.00	20.50	20.50	21.00	21.00	21.00	19.00	19.00
1913.....	24.50	24.50	24.00	23.50	23.50	23.50	23.50	23.00	23.00	23.00	21.50	21.00
1912.....	19.25	19.00	19.00	19.50	19.75	19.75	20.00	21.00	21.50	22.50	24.00	24.50
1911.....	21.50	21.00	21.00	21.00	21.00	20.50	20.50	20.50	20.50	20.25	19.50	19.25

* Nominal.

Market History —

Southern No. 2, Birmingham, 1904-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$23.30	$24.50	$26.50	$27.00	$27.00	$26.75	$25.00	$23.60	$22.75	$20.20	$19.25	$21.00
1922	16.15	19.25	15.25	16.00	17.60	18.50	18.50	20.70	26.25	27.40	24.00	22.50
1921	33.75	27.70	25.10	23.00	22.50	21.70	20.25	19.00	19.00	19.00	18.25	17.00
1920	38.20	40.00	40.00	40.00	42.00	42.30	42.30	42.00	42.00	42.00	39.50	38.00
1919	31.00	31.00	30.00	26.75	26.25	25.25	25.00	26.75	26.75	27.45	30.65	35.15
1918	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	25.25
1917	23.00	24.50	28.00	35.80	35.75	35.75	46.00	48.00	43.50	33.50	33.50	33.50
1916	14.50	14.65	15.00	15.00	15.00	14.45	14.00	13.60	14.40	15.15	19.60	23.00
1915	9.50	9.50	9.40	9.35	9.75	9.55	9.60	11.00	11.30	11.75	13.15	14.20
1914	10.50	10.50	10.60	10.50	10.50	10.45	10.05	10.00	10.00	10.00	9.90	9.50
1913	13.70	13.50	13.00	12.50	11.75	10.60	10.50	11.00	11.00	11.00	10.75	11.00
1912	10.00	10.00	10.05	10.50	10.95	11.00	11.25	11.65	12.50	13.45	13.75	13.50
1911	11.00	11.00	11.00	11.00	10.75	10.25	10.00	10.05	10.10	10.00	9.75	10.00
1910	14.00	13.50	13.00	12.10	11.80	11.60	11.40	11.00	11.00	11.00	11.00	11.00
1909	13.00	12.70	11.75	11.00	11.00	11.30	12.30	13.00	14.00	14.50	14.50	14.00
1908	12.80	12.50	12.10	11.90	11.50	12.00	11.60	12.05	12.50	12.50	12.50	13.00
1907	23.00	23.00	22.75	22.00	21.40	21.25	20.50	19.80	18.10	17.65	16.00	14.90
1906	14.00	14.00	13.70	13.65	13.75	13.50	13.00	14.15	16.00	17.15	21.25	22.00
1905	13.50	13.50	13.50	13.25	12.75	11.85	11.00	11.65	11.75	12.50	14.00	14.00
1904	9.75	9.50	9.70	10.00	9.65	9.15	9.15	9.50	9.50	10.65	12.75	13.05

Southern Ohio No. 2, Ironton, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$27.90	$28.40	$30.75	$31.00	$31.00	$28.25	$26.50	$26.00	$24.90	$23.90	$22.50	$22.50
1922	19.60	19.15	19.00	20.30	22.70	23.25	24.15	27.00	33.75	32.40	29.25	27.00
1921	34.60	30.00	27.50	25.85	24.50	22.80	20.50	20.15	20.30	21.00	20.50	20.00
1920	39.50	43.00	43.25	43.25	44.00	44.00	44.00	46.50	46.80	46.00	44.00	37.25
1919	31.00	31.00	29.95	26.75	26.75	26.75	26.75	26.75	26.75	28.80	31.75	36.55
1918	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	34.00	34.00	34.00
1917	30.00	30.75	35.80	37.75	41.20	47.50	54.50	55.00	49.25	33.00	33.00	33.00
1916	18.30	18.50	18.30	18.50	18.50	18.15	18.45	18.40	18.15	19.40	24.00	30.00
1915	12.75	12.75	12.75	12.75	12.56	12.50	12.60	13.65	14.20	14.90	16.15	17.00
1914	13.00	13.00	13.25	13.50	13.50	13.50	13.00	13.50	13.00	13.00	12.65	12.65
1913	17.90	17.50	17.20	16.85	16.20	15.90	15.40	15.20	15.20	14.75	14.70	13.50

No. 2X Foundry, Buffalo, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$28.00	$28.50	$29.40	$30.10	$29.80	$29.50	$26.60	$25.50	$25.25	$23 00	$20.70	$22.00
1922	19.80	19.15	18.30	20.75	23.00	23.85	25.35	31.50	33.75	31.50	27.85	26.00
1921	33.75	31.25	28.25	26.75	26.25	23.85	21.75	21.25	21.05	20.40	20.00	20.00
1920	41.50	44.60	45.15	46.25	46.25	46.25	46.25	48.75	51.25	51.25	46.00	48.25
1919	32.25	32.25	31.45	28.00	28.00	28.00	28.00	28.70	28.75	29.90	34.45	39.50
1918	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	35.25	35.25	35.25
1917	35.00	35.00	38.15	40.00	42.75	49.15	53.50	54.00	49.05	33.50	33.50	33.50
1916	18.50	18.60	18.85	19.15	19.00	18.75	18.75	18.75	18.90	20.70	26.65	33.65
1915	13.15	13.05	12.55	12.75	12.75	12.75	12.80	13.70	15.15	15.80	16.70	18.00
1914	13.00	13.00	13.75	13.90	13.50	13.05	13.05	13.20	13.25	12.60	12.45	13.10
1913	17.25	17.00	17.00	16.50	15.50	14.75	14.00	14.00	14.25	14.00	14.00	14.00

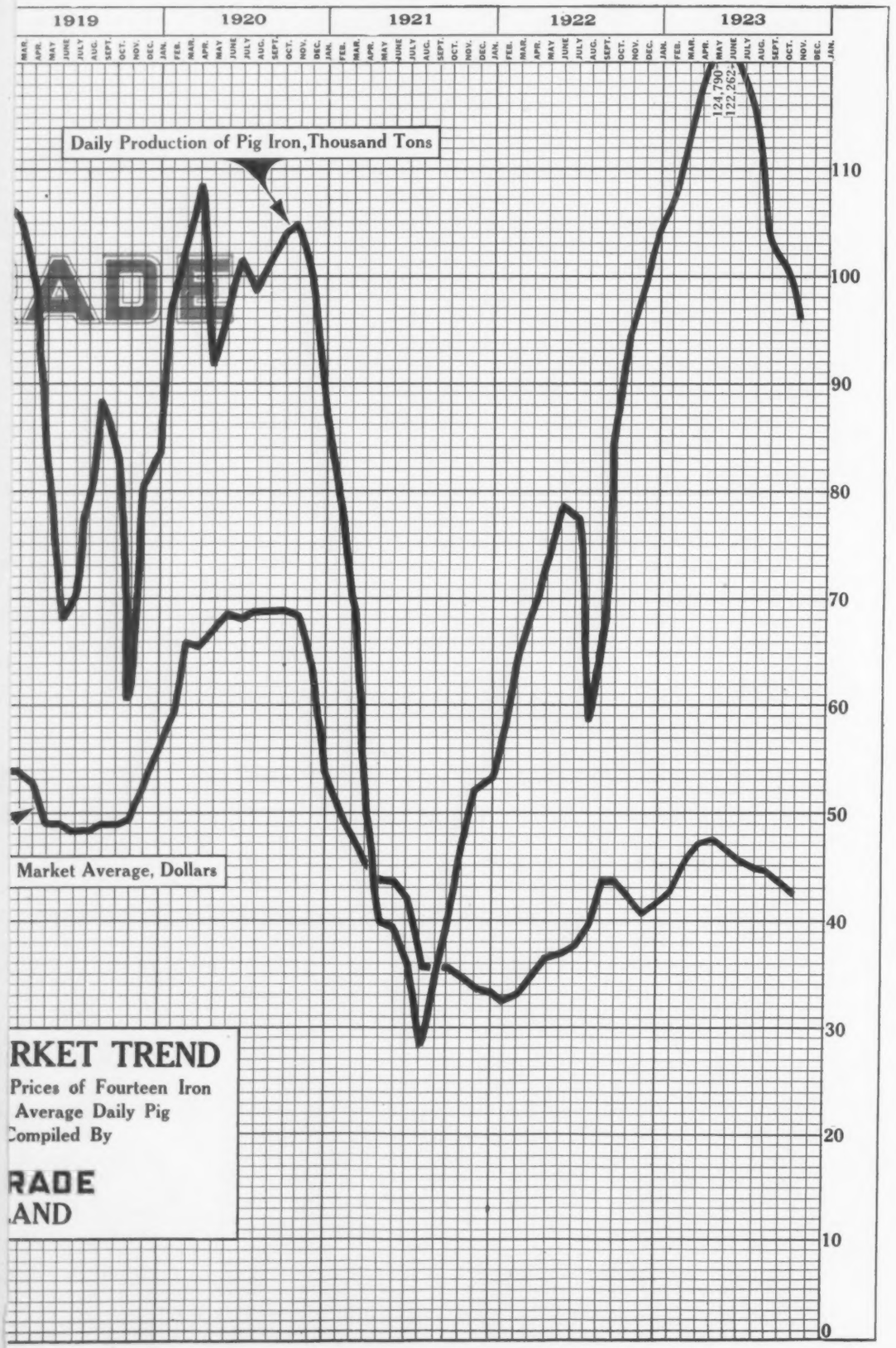
Lake Superior Charcoal, Chicago, 1907-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$33.15	$33.53	$35.53	$36.55	$36.55	$36.65	$36.62	$32.10	$32.04	$30.04	$28.65	$29.04
1922	31.50	30.50	26.90	26.50	28.40	30.00	31.65	33.75	36.15	36.15	36.15	36.15
1921	40.25	38.50	38.50	38.50	38.50	38.50	36.87	34.30	33.25	32.50	32.25	31.50
1920	48.75	55.65	57.50	57.50	57.50	57.50	57.50	57.50	58.30	58.50	58.50	53.50
1919	38.70	38.70	38.70	33.25	31.75	31.75	31.75	32.75	32.75	33.15	35.50	41.00
1918	37.50	37.50	37.50	37.50	37.50	37.50	37.70	37.70	37.70	37.70	38.70	38.70
1917	33.75	34.50	37.55	42.25	49.25	51.80	59.50	59.50	59.50	48.50	37.50	37.50
1916	19.25	19.50	19.75	19.75	19.75	19.75	19.75	19.75	19.75	20.35	21.95	31.75
1915	15.75	15.75	15.75	15.75	15.25	15.25	15.75	15.75	15.95	16.25	17.50	19.25
1914	15.50	15.50	15.50	15.50	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75
1913	18.25	18.00	18.00	18.00	18.00	16.75	16.75	15.00	15.00	15.75	15.50	15.50
1912	16.50	16.50	16.50	15.50	15.75	15.75	16.25	16.75	17.75	18.75	18.75	18.75
1911	17.50	17.50	17.50	17.50	17.00	17.00	17.00	17.00	17.00	17.00	16.50	16.50
1910	19.50	19.50	19.00	19.00	19.00	18.50	18.50	18.50	18.50	18.00	18.00	17.50
1909	19.50	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70
1908	22.80	31.50	21.50	21.10	19.85	19.50	19.50	19.50	19.50	19.50	19.50	19.50
1907	25.50	26.75	25.50	26.00	27.10	27.40	27.10	27.00	26.75	26.10	25.25	23.50

No. 2X Virginia Furnace, 1911-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$27.50	$27.50	$28.25	$29.25	$28.60	$28.00	$27.25	$26.25	$25.50	$25.00	$25.00	$24.50
1922	21.75	22.00	22.50	22.85	23.50	24.50	26.00	26.00	33.00	33.00	31.40	27.75
1921	34.50	31.25	28.05	27.10	27.00	26.00	24.50	24.00	23.00	23.25	22.80	22.50
1920	41.25	42.75	43.25	44.25	45.75	46.25	46.75	49.25	50.25	49.75	45.75	42.05
1919	35.25	33.00	31.55	28.45	27.50	26.50	26.50	28.25	29.25	30.35	33.40	38.25
1918	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	33.50	37.50	38.00	38.00
1917	26.50	28.25	34.25	38.30	41.00	46.50	52.25	51.90	46.50	33.50	33.50	33.50
1916	17.25	18.00	18.25	18.50	18.50	18.50	18.50	18.50	17.50	18.50	23.75	27.00
1915	12.50	12.50	12.50	12.50	12.50	12.50	12.50	13.00	13.50	14.00	15.50	17.00
1914	12.75	12.75	12.75	12.75	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
1913	16.00	15.50	15.50	15.00	14.50	13.75	13.00	13.00	13.00	13.00	13.00	12.75
1912	12.25	12.25	12.25	13.00	13.00	13.25	13.50	14.00	14.50	15.50	16.00	16.00
1911	12.75	12.75	13.00	13.00	13.00	12.25	12.25	12.25	12.25	12.25	12.25	12.25

1913
1914
1915
1916
1917
1918
1919
1920
110
100
90
80
70
60
50
40
30
20
10
0
Daily Production of Pig Iron, Thousand Tons
Composite Market Average, Dollars
Daily Production of Pig Iron
Composite Market Average, Dollars
IRON TRADE REVIEW
COMPOSITE MARKET TREND
Combined Average Monthly Prices of Fourteen Iron and Steel Products and Average Daily Pig Iron Production Compiled By
IRON TRADE REVIEW
CLEVELAND


1919
1920
1921
1922
1923
Daily Production of Pig Iron, Thousand Tons
Market Average, Dollars
124,790
122,262
110
100
90
80
70
60
50
40
30
20
10
0
RKET TREND
Prices of Fourteen Iron
Average Daily Pig
Compiled By
RADE
AND

Market History —

Semifinished Material

Per Gross Ton

Bessemer Billets, Pittsburgh, 1895-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$37.50	$38.85	$44.50	$46.00	$45.00	$42.90	$42.50	$42.50	$42.50	$41.50	$41.50	$40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	29.00	29.00
1920.....	49.60	61.25	65.00	68.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	62.50	64.85	69.30	75.20	88.65	95.60	102.25	92.25	74.05	58.75	47.50	47.50
1916.....	34.05	35.50	41.10	46.25	46.10	43.00	42.50	45.15	47.50	48.10	53.10	59.50
1915.....	19.75	20.00	20.00	20.00	20.05	20.35	21.45	23.00	24.70	25.20	27.10	30.75
1914.....	20.00	20.90	21.05	21.05	20.00	19.80	19.55	20.05	21.00	20.40	19.25	18.85
1913.....	28.90	28.90	29.00	29.00	27.80	26.75	26.75	26.30	25.00	23.00	21.10	20.10
1912.....	20.00	20.00	19.90	20.00	21.10	21.90	22.25	22.40	23.75	25.70	26.75	27.00
1911.....	23.00	23.00	23.00	23.00	23.00	21.00	21.00	21.00	21.00	20.00	19.70	19.25
1910.....	27.87	27.50	27.50	27.00	26.10	25.50	25.00	25.00	24.50	23.40	23.00	23.00
1909.....	25.00	23.50	23.00	22.00	22.50	23.00	24.00	25.00	26.00	26.50	27.50	27.50
1908.....	28.00	28.00	28.00	28.00	28.00	26.50	25.00	25.00	25.00	25.00	25.00	25.00
1907.....	29.75	29.50	29.25	29.75	30.25	31.00	30.00	30.00	29.50	28.50	28.00	28.00
1906.....	27.00	27.50	27.65	27.75	27.00	26.25	27.00	28.00	28.50	28.50	29.00	29.75
1905.....	21.00	24.90	24.60	25.50	23.50	22.00	22.00	23.50	25.75	25.95	26.30	26.50
1904.....	23.00	23.00	23.00	23.00	22.00	21.50	21.00	20.00	19.50	19.50	21.00	21.00
1903.....	29.75	30.00	30.25	31.00	30.50	29.50	27.50	27.00	27.00	26.50	23.50	23.00
1902.....	28.05	29.80	31.35	32.25	33.90	35.20	33.50	32.10	31.50	29.80	29.00	29.25
1901.....	19.70	19.75	20.80	24.10	24.20	24.45	24.25	24.40	24.10	26.80	28.25	27.60
1900.....	35.00	35.00	35.00	34.50	29.00	27.25	22.50	18.00	17.50	17.50	19.30	19.75
1899.....	16.75	18.25	24.00	25.50	27.00	31.50	33.50	36.50	39.00	37.50	36.00	35.00
1898.....	15.00	15.00	15.25	15.25	14.85	14.75	14.75	15.45	16.10	15.75	15.25	16.00
1897.....	15.25	15.50	15.50	14.75	14.00	14.25	14.00	14.15	15.75	16.50	15.75	15.00
1896.....	17.05	17.65	17.50	18.90	19.50	19.75	19.90	19.75	19.60	20.25	20.00	17.00
1895.....	14.85	15.00	14.85	15.40	16.75	18.75	20.85	22.00	24.25	22.00	19.50	17.00

Open-hearth Billets, Pittsburgh, 1910-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$37.50	$38.85	$44.50	$46.00	$45.00	$42.90	$42.50	$42.50	$42.50	$41.50	$41.50	$40.00
1922.....	29.00	28.00	28.30	30.10	34.50	35.00	35.00	35.00	39.50	40.00	38.80	36.50
1921.....	43.50	41.00	38.50	37.75	37.00	37.00	32.25	30.00	29.80	30.00	29.00	29.00
1920.....	49.60	61.25	66.25	70.00	70.00	66.25	65.00	61.25	60.00	58.75	52.50	46.25
1919.....	43.50	43.50	42.25	38.50	38.50	38.00	37.30	38.00	38.50	39.30	40.85	45.00
1918.....	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50	47.50
1917.....	60.00	62.50	67.00	72.50	85.00	93.75	100.00	93.00	73.75	58.75	47.50	47.50
1916.....	34.75	35.00	40.60	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	58.75
1915.....	19.50	19.50	19.50	19.50	19.50	19.85	21.50	24.00	25.60	26.50	28.00	30.20
1914.....	20.00	20.75	21.00	20.80	20.00	19.75	19.30	20.00	21.00	20.60	19.00	18.50
1913.....	28.70	29.40	29.50	29.50	28.10	26.50	26.50	26.10	25.00	23.00	20.85	20.00
1912.....	19.75	19.50	19.40	20.25	21.00	21.25	21.75	21.75	21.75	21.75	21.75	28.00
1911.....	23.00	23.00	23.00	23.00	22.00	21.00	21.00	21.00	20.25	19.50	19.75	19.25
1910.....	28.00	28.00	28.50	28.75	28.75	27.00	26.50	26.00	25.00	24.00	23.25	23.00

Wire Rods, Pittsburgh, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$45.00	$47.50	$47.00	$46.60	$51.00	$51.00	$51.00	$51.00	$51.00	$51.00	$51.00	$51.00
1922.....	37.00	35.75	35.80	38.00	38.00	38.00	39.50	40.00	45.00	45.00	46.50	46.50
1921.....	57.00	57.00	52.00	50.00	48.00	47.00	42.25	42.00	40.80	40.00	38.00	38.00
1920.....	52.00	56.00	62.50	70.00	70.00	70.00	70.00	70.00	70.00	75.00	72.50	57.00
1919.....	57.00	57.00	55.75	52.00	52.00	52.00	52.00	52.00	52.00	52.00	56.00	62.00
1918.....	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.25	57.50	57.50	57.50
1917.....	73.75	75.00	75.00	83.75	88.00	92.50	95.00	96.00	90.00	73.50	57.00	57.00
1916.....	46.25	50.00	51.00	55.00	60.00	60.00	58.75	55.00	55.00	55.00	64.00	69.00
1915.....	25.00	25.00	25.00	25.00	25.00	25.00	25.60	26.75	28.50	30.00	34.50	39.00
1914.....	25.50	25.90	26.00	26.00	26.00	25.50	24.80	24.50	25.60	26.00	25.75	25.00
1913.....	30.00	30.00	30.00	30.00	30.00	29.50	28.60	27.60	27.50	26.80	26.00	25.75

Open-hearth Sheet Bars, Pittsburgh, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$37.50	$39.25	$44.50	$45.85	$45.40	$42.90	$42.50	$42.50	$42.50	$42.50	$42.50	$42.50
1922.....	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921.....	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920.....	53.40	65.00	72.50	78.00	78.75	75.00	75.00	71.25	68.50	63.75	56.25	47.65
1919.....	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48.00
1918.....	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00	51.00
1917.....	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	51.00
1916.....	34.75	35.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915.....	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914.....	20.60	21.75	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913.....	29.20	29.90	30.00	30.00	28.80	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Bessemer Sheet Bars, Pittsburgh, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$37.50	$39.25	$44.50	$45.85	$45.40	$42.90	$42.50	$42.50	$42.50	$42.50	$42.50	$42.50
1922.....	30.00	29.00	29.40	31.50	35.00	35.00	35.00	35.00	39.50	39.85	38.80	36.50
1921.....	47.00	43.00	39.60	38.75	39.00	37.40	34.00	32.00	30.40	31.50	30.00	29.25
1920.....	53.40	65.00	70.00	70.00	75.00	70.00	70.00	70.00	68.50	63.75	56.25	47.65
1919.....	47.00	47.00	45.75	42.00	42.00	41.50	40.80	42.00	42.00	42.00	45.00	48 00
1918.....	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00
1917.....	60.00	62.50	67.50	72.00	88.00	101.25	105.00	96.00	82.50	65.50	57.00	57.00
1916.....	33.75	34.00	41.00	45.00	44.25	41.20	40.00	43.60	45.00	45.75	52.00	59.00
1915.....	20.00	20.00	20.00	19.60	20.00	20.35	22.00	25.00	25.80	26.50	28.50	30.80
1914.....	21.00	22.00	22.00	21.60	21.00	20.75	20.20	21.00	22.00	21.60	19.60	19.00
1913.....	28.70	29.40	29.50	29.50	28.40	27.50	27.50	27.10	25.60	23.80	21.75	21.00

Market History —

Beehive Coke

Per Net Ton

Foundry Spot, Connellsville, 1900-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$9.00	$8.60	$8.15	$7.80	$6.10	$5.50	$5.15	$5.20	$5.70	$4.80	$4.85	$5.15
1922	3.85	3.80	4.05	4.95	6.50	7.20	11.40	14.30	12.75	12.10	8.40	7.50
1921	6.50	6.30	6.05	5.00	4.85	4.50	4.45	4.00	4.30	4.50	4.30	4.15
1920	7.00	7.00	7.00	11.60	12.50	15.00	16.00	18.25	17.90	16.85	9.40	7.25
1919	7.05	5.15	4.80	4.55	4.35	4.70	4.80	5.20	5.90	5.60	6.95	7.15
1918	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1917	10.40	10.90	11.30	9.65	9.65	11.20	15.00	12.70	13.35	7.00	7.00	7.00
1916	3.75	3.75	3.60	3.85	3.10	3.00	3.00	3.05	3.25	4.35	8.60	9.25
1915	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.25	2.30	2.95	3.15
1914	2.50	2.40	2.40	2.40	2.40	2.35	2.30	2.25	2.25	2.20	2.10	2.00
1913	4.45	3.70	3.50	3.05	2.90	2.85	2.85	2.85	2.85	2.75	2.50	2.50
1912	2.05	2.20	2.65	2.75	2.60	2.55	2.45	2.60	2.65	3.35	4.40	4.50
1911	1.95	1.95	2.00	2.00	1.90	1.75	1.80	1.85	1.85	1.85	1.90	1.90
1910	3.00	2.90	2.80	2.55	2.30	2.15	2.10	2.15	2.10	2.05	2.00	2.00
1909	1.70	1.60	1.55	1.50	1.45	1.50	1.50	1.65	2.30	2.75	2.80	2.75
1908	1.80	1.75	1.70	1.65	1.65	1.65	1.65	1.65	1.65	1.70	1.75	1.80
1907	3.75	3.55	3.00	2.70	2.15	2.05	2.40	2.60	2.80	2.90	2.40	2.00
1906	3.00	2.40	2.35	2.60	2.55	2.40	2.55	2.70	2.75	2.85	3.20	3.60
1905	2.80	2.50	2.50	2.00	1.90	1.85	1.80	1.85	2.00	2.70	3.00	2.85
1904	1.45	1.50	1.55	1.50	1.45	1.40	1.40	1.40	1.40	1.45	1.85	2.15
1903	4.50	4.50	4.00	3.75	3.50	3.00	2.50	2.00	2.00	1.90	1.90	1.75
1902	2.25	2.25	2.50	2.50	2.50	2.50	2.50	3.25	4.00	5.00	5.00	5.00
1901	1.75	1.75	2.00	2.00	2.00	1.85	1.75	1.75	1.75	2.00	2.00	2.00
1900	3.00	3.50	4.00	3.75	3.00	2.50	2.00	1.75	1.75	1.75	1.75	1.75

Furnace Spot, Connellsville, 1914-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$8.25	$7.20	$7.15	$6.25	$5.10	$4.65	$4.35	$4.45	$4.55	$3.85	$3.80	$4.20
1922	2.75	2.95	3.25	4.30	6.00	6.60	10.65	13.20	11.00	10.60	7.10	6.25
1921	5.15	4.85	4.55	3.60	3.25	3.15	2.75	2.85	3.15	3.25	3.15	2.95
1920	6.00	6.00	6.00	11.20	12.00	14.50	15.20	17.75	16.90	15.15	8.40	6.25
1919	5.85	4.40	4.30	4.05	3.95	4.10	4.25	4.60	4.95	4.35	5.75	6.20
1918	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1917	9.05	11.20	9.40	7.60	8.35	11.40	12.10	13.70	12.10	6.00	6.00	6.00
1916	2.50	3.00	3.00	2.25	2.25	2.55	2.70	2.75	2.95	5.30	7.05	8.25
1915	1.60	1.55	1.50	1.50	1.55	1.55	1.70	1.50	1.60	1.70	2.10	2.10
1914	1.80	1.80	1.95	1.90	1.75	1.75	1.75	1.75	1.65	1.65	1.60	1.60

Iron and Steel Scrap

Per Gross Ton

Heavy Melting Steel, Pittsburgh, 1902-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$21.65	$23.40	$26.10	$25.85	$22.50	$20.50	$18.25	$17.50	$18.00	$16.10	$15.70	$18.50
1922	14.50	14.70	14.95	16.50	17.00	16.85	16.50	17.10	29.75	21.35	20.30	20.00
1921	15.00	15.00	15.00	13.00	13.60	13.10	12.00	12.60	11.30	14.00	14.25	14.25
1920	26.50	28.15	28.00	26.40	25.50	25.30	25.70	27.75	28.60	28.00	24.00	18.75
1919	20.80	17.00	14.60	15.75	15.55	17.25	19.90	21.25	20.50	20.00	21.90	24.65
1918	30.00	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
1917	23.25	21.90	23.40	28.15	28.40	40.00	40.25	36.60	35.50	31.30	29.60	30.00
1916	17.50	17.35	17.95	18.10	17.10	16.25	16.25	16.00	16.10	17.80	20.55	26.75
1915	11.55	11.60	12.00	11.90	11.75	11.75	11.75	13.38	14.25	14.00	15.30	17.40
1914	11.30	12.15	12.40	12.25	12.00	12.00	12.00	11.65	11.65	11.40	10.40	10.45
1913	15.15	14.90	14.40	14.40	14.15	13.50	12.75	12.65	12.65	12.65	11.75	11.20
1912	12.50	12.65	12.40	13.00	13.40	13.40	13.65	13.55	13.90	14.40	15.30	15.00
1911	13.50	14.30	14.40	13.50	12.75	13.15	12.90	13.40	13.15	12.25	12.15	12.50
1910	17.90	17.65	17.00	17.00	16.00	15.25	14.50	14.25	14.25	14.40	14.15	13.75
1909	16.50	16.00	14.75	14.15	14.95	15.50	15.75	16.00	16.75	17.90	18.15	17.95
1908	13.25	13.25	13.50	12.75	12.75	13.00	13.25	14.75	14.75	14.50	14.75	16.25
1907	19.25	18.75	18.25	18.25	18.15	18.65	18.50	18.25	17.75	17.50	15.45	13.75
1906	17.75	16.65	15.90	14.65	15.25	15.00	15.75	16.00	16.90	16.75	17.25	19.75
1905	16.75	16.15	16.50	16.50	15.40	14.50	14.25	14.15	15.40	16.20	17.15	18.25
1904	12.65	13.25	13.75	14.15	13.05	11.50	10.75	11.15	11.75	12.00	13.65	14.90
1903	22.25	21.75	21.25	22.15	21.65	20.50	20.25	18.75	18.25	16.00	14.50	11.50
1902	17.25	17.45	18.55	19.40	20.25	21.40	22.25	21.25	21.25	21.65	21.15	22.25

Heavy Melting Steel, Chicago, 1909-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$18.70	$19.75	$23.15	$22.40	$19.75	$17.75	$17.10	$16.25	$16.55	$14.50	$13.80	$16.00
1922	11.20	11.15	12.05	13.55	14.65	14.45	15.15	15.85	18.15	18.50	17.40	16.75
1921	15.25	15.25	12.55	11.25	11.50	11.20	10.55	10.70	11.30	12.55	12.40	11.00
1920	24.25	25.05	24.20	23.95	23.15	22.40	23.70	24.15	24.20	21.40	18.50	16.75
1919	19.20	14.90	15.25	16.40	15.40	16.75	19.40	20.75	19.00	18.80	20.65	21.25
1918	29.70	30.00	30.00	28.65	28.90	29.00	29.00	29.00	29.00	29.00	29.00	26.50
1917	20.25	21.65	23.00	26.65	28.70	37.00	35.50	33.10	32.65	27.00	28.50	28.90
1916	15.50	15.25	16.20	16.75	16.50	15.35	14.15	14.90	15.50	16.50	19.35	23.35
1915	8.90	9.45	9.75	9.30	9.25	9.40	10.15	11.50	12.00	11.55	13.15	15.40
1914	9.20	10.00	9.80	9.50	9.95	9.75	9.50	9.50	9.40	9.00	8.25	8.25
1913	12.75	12.50	12.50	12.50	12.00	12.00	12.00	12.00	12.00	12.00	9.00	9.00
1912	11.00	10.75	11.25	12.25	12.25	12.25	11.75	12.50	13.00	14.00	13.75	13.75
1911	11.50	12.00	12.00	11.50	10.25	10.25	10.25	10.75	10.50	10.00	9.75	9.75
1910	16.00	15.50	14.50	14.50	13.00	13.00	12.50	12.25	12.25	12.25	12.00	12.00
1909	14.00	13.40	12.15	12.90	13.50	14.15	14.05	14.95	15.80	16.30	15.75	15.50

Market History —

Cast Borings, Pittsburgh, 1902-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$18.50	$19.75	$21.80	$21.10	$21.60	$17.50	$15.50	$15.00	$16.00	$13.40	$12.40	$14.00
1922	10.40	11.25	11.85	13.00	14.15	14.80	15.75	15.75	17.30	18.15	17.75	17.50
1921	12.50	12.35	11.60	9.70	9.50	9.00	7.60	8.00	9.05	11.60	10.65	9.55
1920	19.35	21.70	20.35	19.85	19.25	18.35	18.25	19.55	20.50	19.35	17.00	14.50
1919	14.00	11.80	10.95	12.60	11.30	11.65	13.90	16.10	15.75	15.75	17.95	18.35
1918	20.00	20.00	20.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	18.00
1917	12.35	12.25	13.20	14.70	15.45	21.10	23.90	22.00	23.55	20.70	20.00	20.00
1916	11.35	11.40	11.40	11.30	10.30	9.90	8.65	8.00	8.50	9.15	9.85	13.35
1915	8.25	8.15	8.40	8.40	8.40	8.65	8.65	9.00	9.25	9.75	10.00	10.20
1914	7.90	8.40	9.25	8.40	8.40	7.90	8.15	8.50	8.50	8.25	8.25	8.25
1913	10 40	10.40	10.40	10.40	10.40	9.25	8.40	8.15	8.15	8.40	7.75	7.45
1912	9.65	9.40	9.15	9.65	10.15	10.15	10.25	10.15	9.90	9.90	10.50	10.40
1911	8.65	8.65	9.50	8.75	8.50	8.90	8.90	9.25	9.40	8.50	8.25	8.35
1910	11.00	10.75	9.75	9.75	9.25	8.75	8.00	8.25	8.40	8.40	8.50	8.65
1909	10.75	9.75	8.25	7.75	7.25	9.65	9.75	9.50	10.65	11.15	11.25	11.00
1908	6.50	7.50	8.00	8.00	7.50	7.75	7.75	8.75	8.75	8.75	9.75	11.00
1907	12.40	12.65	13.15	13.65	13.50	13.75	13.75	13.25	13.25	13.00	9.95	6.50
1906	10.50	10.15	9.65	8.15	8.90	8.75	8.75	9.00	9.75	10.25	10.75	12.25
1905	10.75	11.25	11.15	10.90	10.15	10.00	9.15	8.40	8.90	9.75	10.50	10.90
1904	6.00	5.75	5.40	6.15	7.15	5.65	5.75	5.25	6.25	6.25	7.40	8.75
1903	11.25	11.50	11.65	11.25	11.25	.....	.....	9.00	9.00	7.00	.....	5.25
1902	8.55	9.15	9.65	10.75	11.75	12.00	11.65	10.75	14.40	15.85	11.65	11.50

Low Phosphorus Scrap, Pittsburgh, 1917-1923

	Jan.	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$25 15	$27.00	$31.30	$32.10	$28.30	$25.00	$23.15	$22.70	$23.50	$22.50	$20.70	$22.50
1922	17.50	17.10	17.10	18.60	20.00	20.60	21.00	20.60	22.90	24.85	25.00	24.50
1921	24.50	22.00	21.20	18.25	18.00	17.00	15.25	15.50	16.30	18.00	17.65	17.25
1920	31.50	33.00	32.60	30.60	30.00	30.75	30.00	33.15	34.00	33.75	31.00	25.50
1919	29.40	24.25	22.50	22.40	22.00	21.25	23.00	24.00	24.00	24.00	25.75	27.50
1918	42.20	40.00	40.00	39.00	39.00	39.00	39.00	39.00	39.00	39.00	38.60	38.50
1917	32.00	30.00	33.00	34.25	36.60	43.50	52.75	43.00	47.25	43.50	39.00	39.00

No. 1 Railroad Wrought, Chicago, 1915-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$19.40	$20.50	$23.25	$22.75	$19.95	$16.95	$16.60	$17.05	$18.25	$15.30	$14.10	$16.00
1922	11.80	11.65	12.25	13.25	14.35	14.20	15.20	16.35	19.95	20.40	18.10	17.00
1921	15.65	15.90	13.50	12.05	11.90	10.80	10.25	11.75	13.05	14.65	13.70	12.10
1920	29.00	30.75	30.70	30.70	29.50	28.00	28.10	28.50	27.50	22.50	19.55	16.60
1919	23.30	16.65	17.65	18.50	17.05	18.70	21.20	23.25	21.25	22.00	26.50	27.00
1918	35.00	35.00	35.00*	35.00	35.00	35.00	35.50	33.50	33.50	33.50	33.50	29.00
1917	23.75	24.00	25.75	29.80	32.60	41.75	39.15	35.40	36.25	31.90	30.60	31.50
1916	15.50	14.95	16.15	16.80	16.35	15.35	13.95	15.40	16.65	17.50	21.25	26.00
1915	8.80	8.90	9.00	8.55	8.75	8.75	8.90	10.10	10.75	10.70	12.75	14.90

* Quotations net tons to March 31, 1918, gross tons thereafter.

No. 1 Railroad Wrought, Eastern Pennsylvania, 1904-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$22.25	$24.10	$27.60	$27.00	$24.40	$22.75	$18.85	$17.50	$19.00	$18.00	$17.75	$18.00
1922	15.00	15.00	15.20	15.63	16.80	17.25	18.00	18.00	20.75	22.00	21.00	18.95
1921	20.00	20.00	18.20	15.50	15.00	15.00	14.25	14.00	14.20	15.40	16.00	15.75
1920	32.90	36.10	36.50	35.25	34.00	33.50	33.50	33.25	34.40	29.85	25.75	20.10
1919	29.80	25.00	24.00	21.50	21.90	22.50	24.70	27.25	27.00	27.00	27.85	30.75
1918	35.00	35.00	35.00*	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917	27.00	26.75	30.00	36.00	40.80	47.85	54.05	46.20	44.50	41.80	35.35	35.00
1916	22.25	22.50	23.00	23.00	22.50	20.00	19.75	20.00	21.00	22.00	20.55	26.75
1915	11.75	12.00	12.50	12.50	12.50	12.75	13.50	15.00	16.00	16.00	17.00	20.00
1914	12.90	14.75	15.25	13.15	13.15	12.65	12.65	12.00	12.50	11.50	11.50	11.50
1913	16.25	16.25	15.25	16.25	15.50	14.75	14.70	14.25	14.25	14.25	13.75	13.35
1912	15.75	14.75	14.50	14.25	16.25	16.00	15.75	15.25	16.65	16.75	17.75	16.75
1911	16.25	16.25	17.75	16.75	15.50	15.25	15.25	15.75	15.75	14.50	14.00	14.45
1910	18.75	19.00	18.75	19.25	18.25	16.75	16.25	16.25	16.15	16.75	16.25	16.25
1909	20.25	19.25	16.25	15.25	16.25	18.60	17.75	18.75	19.75	20.75	21.25	20.25
1908	14.25	14.25	15.25	14.75	15.50	15.75	16.00	16.50	18.25	18.25	18.50	19.75
1907	23.25	22.25	21.00	20.50	20.00	20.75	20.25	19.75	18.00	18.00	17.25	14.75
1906	22.75	21.00	19.75	20.25	20.75	18.25	17.50	18.25	20.75	22.25	22.25	23.25
1905	19.75	21.75	22.00	22.75	21.75	18.75	17.00	17.50	19.50	21.75	19.85	23.25
1904	14.65	16.00	16.50	18.25	17.75	14.00	12.75	13.25	14.40	15.25	16.25	19.00

* Quotations net tons to March 31, 1918, gross tons thereafter.

Machine Shop Turnings, Pittsburgh, 1906-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923	$16.75	$18.25	$20.65	$20.10	$18.91	$16.60	$13.50	$11.40	$12.75	$11.40	$11.00	$13.50
1922	9.50	9.55	10.65	12.30	13.45	13.65	13.75	13.95	15.45	15.40	16.25	15.90
1921	10.50	10.50	9.70	8.55	8.50	7.90	7.25	7.65	8.55	10.25	10.25	9.20
1920	16.75	19.25	18.40	16.85	15.15	17.65	13.55	15.75	15.80	16.00	14.75	11.60
1919	11.50	9.70	9.75	11.15	10.00	10.65	12.70	14.00	13.25	12.75	14.00	15.50
1918	20.00	20.00	20.00	19.00	18.70	18.50	18.50	18.50	18.50	18.50	18.50	17.75
1917	12.10	12.00	12.45	13.90	14.55	20.80	23.70	21.20	23.25	19.50	19.65	20.00
1916	10.35	9.55	10.75	11.20	10.35	10.05	8.55	7.75	7.25	8.00	9.10	12.75
1915	7.75	7.90	7.90	7.90	7.90	8.15	8.00	7.65	8.65	8.65	9.15	8.75
1914	6.90	7.65	8.70	8.15	8.00	7.90	7.90	7.90	7.90	8.00	7.95	7.75
1913	10.65	10.25	9.50	9.00	8.65	7.25	6.75	6.75	6.75	7.15	7.15	6.40
1912	10.25	9.75	9.50	10.00	10.25	10.90	11.00	11.00	10.65	10.90	11.50	11.25
1911	9.00	9.40	10.50	9.50	9.15	9.15	9.15	9.75	9.65	9.15	9.90	9.35
1910	13.25	13.00	12.00	11.75	11.25	10.25	9.25	9.25	9.00	9.00	9.15	9.25
1909	13.00	11.75	10.25	8.75	8.25	11.25	11.75	11.50	12.50	13.25	13.75	13.25
1908	7.75	8.75	8.75	8.50	8.25	8.25	8.25	9.00	9.50	9.50	10.50	11.75
1907	15.25	15.00	15.75	16.00	15.75	15.50	15.50	15.25	14.50	14.00	11.60	7.75
1906	.....	.....	12.50	11.75	11.25	11.25	11.25	11.50	12.40	12.25	12.40	14.75

Market History —

No. 1 Cast, Pittsburgh, 1917-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$22.65	$24.50	$27.70	$27.75	$25.60	$23.75	$21.50	$21.20	$21.50	$19.35	$18.50	$20.00
1922.....	16.00	16.00	16.40	17.25	18.50	18.70	19.15	19.00	21.75	23.35	23.30	22.50
1921.....	24.50	22.00	21.00	18.25	17.50	16.00	15.00	14.85	16.30	17.50	17.10	16.25
1920.....	32.50	41.50	41.00	39.60	39.00	40.00	38.50	41.50	42.20	40.75	38.00	27.50
1919.....	25.60	21.00	21.00	21.75	21.00	21.00	21.00	24.00	24.50	25.00	28.75	30.50
1918.....	28.00	28.00	28.00	34.00	32.50	32.50	32.50	32.50	32.50	32.50	32.40	32.00
1917.....	20.00	19.75	21.50	23.35	24.60	33.25	34.75	35.00	32.50	28.00	28.50	28.50

No. 1 Cast, Eastern Pennsylvania, 1915-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$23.30	$24.75	$28.00	$26.85	$24.80	$22.75	$21.00	$20.00	$20.35	$19.70	$19.50	$20.00
1922.....	16.75	16.50	17.00	17.40	17.90	18.50	18.00	18.00	20.65	23.00	21.90	20.50
1921.....	24.15	23.35	20.50	18.15	17.90	17.50	17.50	16.50	16.50	17.50	18.00	17.50
1920.....	36.50	38.55	40.00	38.00	38.00	37.00	37.20	38.75	39.80	38.00	34.75	28.90
1919.....	28.15	25.00	22.50	22.50	21.50	22.00	23.50	24.65	25.00	25.15	28.00	31.75
1918.....	33.50	34.50	33.90	32.75	33.00	33.75	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	20.75	20.15	22.50	26.75	30.00	34.75	38.35	34.10	32.90	30.00	30.50	32.00
1916.....	17.50	17.50	17.75	18.00	17.75	16.50	16.00	16.00	16.25	16.50	18.50	22.00
1915.....	12.00	12.00	12.50	12.50	12.00	12.25	12.25	13.50	14.50	14.50	15.00	15.60

No. 1 Cast, Chicago, 1918-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$24.30	$25.75	$28.50	$27.55	$24.20	$23.25	$23.25	$21.20	$21.50	$20.40	$20.55	$21.50
1922.....	14.00	14.50	15.10	16.15	17.40	17.30	17.65	19.70	23.80	24.00	22.90	22.00
1921.....	20.35	21.15	18.10	15.25	15.85	14.90	13.75	13.95	14.50	15.25	15.50	14.00
1920.....	42.50	43.25	42.20	44.10	42.50	41.75	41.20	42 00	39.30	32.75	27.65	22.10
1919.....	26.25	22.05	23.10	23.50	22.35	23.40	20.65	27.75	26.75	28.15	31.10	35.35
1918.....	30.00	30.00	33.00	32.45	30.75	31.00	31.80	33.40	34.00	34.00	32.75	29.00

Rerolling Rails, Chicago, 1908-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$20.55	$22.00	$24.90	$23.65	$21.80	$19.40	$18.40	$17.75	$18.30	$16.25	$15.10	$17.00
1922.....	12.50	11.50	12.85	14.25	15.50	15.40	16.00	16.75	19.40	20.50	18.90	18.00
1921.....	15.80	15.90	13.30	12.70	13.25	12.80	12.45	12.70	13.05	14.00	13.90	12.50
1920.....	33.60	34.65	32.60	32.50	31.50	32.35	34.90	38.00	38.50	34.00	24.15	17.40
1919.....	22.30	15.55	16.30	17.95	17.45	19.25	24.70	29.00	25.38	26.80	31.15	31.50
1918.....	35.30	35.00	35.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
1917.....	27.25	25.65	27.25	31.90	36.80	46.00	46.25	41.90	41.25	36.00	35.70	35.65
1916.....	17.70	17.10	17.20	17.90	17.25	16.25	15.70	15.70	16.90	18.75	24.90	29.50
1915.....	9.50	9.60	10.00	9.85	10.00	10.00	10.10	11.75	13.15	13.25	14.30	16.70
1914.....	11.00	11.20	11.25	11.25	11.25	11.25	11.25	11.25	10.85	10.00	9.50	9.50
1913.....	16.25	15.50	15.00	14.50	14.00	14.00	12.00	12.50	12.00	12.00	12.00	11.50
1912.....	13.00	13.00	12.75	12.75	13.25	13.50	13.25	13.50	14.75	16.00	16.50	16.50
1911.....	13.50	13.50	13.50	13.00	12.75	12.25	12.25	12.50	12.25	12.25	12.00	12.25
1910.....	17.75	17.75	17.50	17.50	17.25	16.50	16.50	15.50	15.75	15.75	15.00	14.00
1909.....	15.80	15.05	12.80	13.20	14.65	15.50	15.55	16.00	17.20	18.00	20.25	17.70
1908.....	12.30	13.00	12.20	12.75	13.20	14.00	14.45	15.60	16.00	15.70	16.95	17.25

Iron Car Wheels, Chicago, 1915-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$25.35	$26.50	$28.50	$27.65	$24.30	$21.50	$20.90	$19.60	$19.60	$18.60	$17.85	$19.00
1922.....	15.25	14.65	15.90	18.15	18.80	18.25	18.90	20.40	23.50	24.75	24.60	23.75
1921.....	21.50	21.40	16.60	14.45	14.50	13.70	12.75	13.70	14.90	16.15	16.25	15.90
1920.....	36.25	38.75	36.15	38.50	38.25	36.00	35.70	38.40	38.80	37.25	33.25	25.80
1919.....	23.20	21.15	20.00	20.40	20.20	22.00	24.40	25.15	23.50	23.60	28.50	29.75
1918.....	30.40	30.00	30.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	27.50
1917.....	19.75	18.30	20.30	23.25	27.20	37.00	36.75	30.70	31.00	25.90	27.50	29.50
1916.....	14.75	14.05	14.05	14 00	13.15	12.50	11.90	12.00	12.25	12.25	15.95	21.00
1915.....	10.00	10.00	10.00	10.00	9.75	9.85	10.30	11.40	11.75	11.75	12.75	14.75

Finished Rolled Material

Per Pound

Steel Bars, Pittsburgh, 1901-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec..
1923.....	2.00c	2.15c	2.30c	2.35c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c	2.40c
1922.....	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921.....	2.35	2.15	2.00	2.05	2.10	2.05	1.85	1.75	1.65	1.60	1.55	1.50
1920.....	3.10	3.85	3.85	3.65	3.25	3.25	3.25	3.25	3.25	3.25	3.00	2.35
1919.....	2.70	2.70	2.60	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.45	2.90
1918.....	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90
1917.....	3.20	3.20	3.45	3.65	3.65	4.00	4.70	4.75	4.25	2.90	2.90	2.90
1916.....	2.40	2.40	2.65	3.00	3.00	2.85	2.75	2.55	2.60	2.70	2.95	3.15
1915.....	1.10	1.10	1.15	1.20	1.20	1.20	1.30	1.35	1.30	1.45	1.70	1.90
1914.....	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.15	1.10	1.10
1913.....	1.45	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.35	1.25
1912.....	1.15	1.15	1.10	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.40	1.40
1911.....	1.40	1.40	1.40	1.40	1.40	1.25	1.25	1.20	1.15	1.10	1.10	1.10
1910.....	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.40	1.40	1.40	1.40
1909.....	1.40	1.30	1.20	1.15	1.20	1.20	1.25	1.35	1.40	1.40	1.45	1.50
1908.....	1.60	1.60	1.60	1.60	1.60	1.50	1.40	1.40	1.40	1.40	1.40	1.40
1907.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1906.....	2.00	1.75	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.55	1.60
1905.....	1.45	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.70	1.80	1.95
1904.....	1.30	1.30	1.35	1.35	1.30	1.30	1.30	1.30	1.35	1.30	1.30	1.40
1903.....	1.65	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.35	1.30
1902.....	1.60	1.50	1.50	1.65	1.80	1.80	1.70	1.75	1.75	1.70	1.60	1.70
1901.....	1.20	1.25	1.45	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.60	1.60

Market History —

Tank Plates, Pittsburgh, 1895-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.05c	2.15c	2.35c	2.45c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c
1922.....	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	2.00
1921.....	2.65	2.35	2.05	2.15	2.20	2.00	1.85	1.75	1.70	1.60	1.60	1.50
1920.....	3.10	3.70	3.75	3.65	3.50	3.50	3.50	3.50	3.50	3.20	3.00	2.65
1919.....	3.00	3.00	2.90	2.65	2.65	2.65	2.65	2.65	2.55	2.65	2.65	2.70
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	4.25	4.30	5.00	5.45	6.40	7.75	9.45	9.20	7.50	3.25	3.25	3.25
1916.....	2.50	2.55	3.15	3.50	3.50	3.50	3.50	3.75	3.70	3.70	3.90	4.25
1915.....	1.10	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.45	1.70	1.95
1914.....	1.20	1.20	1.20	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.10	1.10
1913.....	1.50	1.50	1.50	1.50	1.50	1.45	1.45	1.45	1.40	1.35	1.30	1.20
1912.....	1.15	1.10	1.10	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911.....	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.30	1.25	1.20	1.10	1.15
1910.....	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909.....	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.70	1.70	1.70	1.70	1.70	1.65	1.60	1.60	1.60	1.60	1.60	1.60
1907.....	1.70	1.70	1.70	1.70	1.80	1.80	1.80	1.70	1.70	1.70	1.70	1.70
1906.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.70
1905.....	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.60	1.60	1.60
1904.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.50
1903.....	1.60	1.60	1.75	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1. 60
1902.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1901.....	1.40	1.40	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900.....	2.40	2.20	2.00	1.80	1.60	1.35	1.05	1.10	1.05	1.05	1.35	1.40
1899.....	1.30	1.45	1.75	2.05	2.10	2.30	2.45	2.55	2.85	2.80	2.50	2.30
1898.....	1.00	1.00	0.95	1.00	1.10	1.10	1.10	1.10	1.15	1.10	1.10	1.15
1897.....	1.10	1.10	1.10	1.05	1.05	1.00	1.00	1.00	1.00	1.05	1.00	1.00
1896.....	1.40	1.35	1.30	1.35	1.30	1.25	1.25	1.20	1.15	1.15	1.10	1.10
1895.....	1.15	1.10	1.10	1.15	1.20	1.25	1.60	1.70	1.80	1.70	1.60	1.50

Structural Shapes, Pittsburgh, 1895-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.05c	2.15c	2.35c	2.45c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c	2.50c
1922.....	1.50	1.40	1.45	1.50	1.60	1.65	1.70	1.80	2.00	2.00	2.00	1.95
1921.....	2.45	2.25	2.10	2.15	2.20	2.05	1.90	1.75	1.70	1.60	1.60	1.50
1920.....	2.65	3.15	3.25	3.25	3.25	3.25	3.25	3.15	3.10	3.10	3.00	2.45
1919.....	2.80	2.80	2.70	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.45	2.50
1918.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
1917.....	3.10	3.25	3.45	3.70	4.00	4.00	4.50	4.50	3.75	3.00	3.00	3.00
1916.....	1.85	2.05	2.40	2.50	2.50	2.50	2.50	2.50	2.60	2.70	2.90	3.00
1915.....	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.35	1.40	1.65	1.75
1914.....	1.20	1.20	1.20	1.20	1.15	1.10	1.10	1.15	1.20	1.15	1.10	1.05
1913.....	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.40	1.35	1.30	1.25
1912.....	1.15	1.15	1.15	1.20	1.25	1.25	1.30	1.35	1.40	1.45	1.50	1.55
1911.....	1.40	1.40	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.30	1.20	1.15
1910.....	1.55	1.55	1.50	1.50	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40
1909.....	1.60	1.45	1.30	1.20	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.70	1.70	1.70	1.70	1.70	1.65	1.65	1.60	1.60	1.60	1.60	1.60
1907.....	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1906.....	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
1905.....	1.50	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.70	1.70	1.70	1.70
1904.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.40	1.40	1.40	1.40
1903.....	1.75	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1902.....	1.60	1.60	1.70	1.85	2.00	2.25	2.25	2.35	2.25	2.15	2.10	2.00
1901.....	1.50	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1900.....	2.25	2.25	2.25	2.25	2.25	2.05	1.90	1.75	1.70	1.70	1.70	1.70
1899.....	1.30	1.30	1.40	1.50	1.50	1.75	1.95	2.05	2.25	2.25	2.25	2.25
1898.....	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.20	1.20	1.20	1.20	1.20
1897.....	1.55	1.55	1.55	1.55	1.30	1.05	1.00	1.00	1.00	1.10	1.10	1.10
1896.....	1.45	1.50	1.45	1.45	1.50	1.55	1.55	1.55	1.55	1.55	1.50	1.45
1895.....	1.25	1.20	1.20	1.20	1.20	1.35	1.50	1.60	1.65	1.60	1.60	1.55

Bar Iron, Chicago, 1907-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.35c	2.45c	2.55c	2.60c	2.60c	2.60c	2.55c	2.50c	2.40c	2.40c	2.40c	2.40c
1922.....	1.60	1.60	1.60	1.65	1.65	1.75	1.80	2.00	2.25	2.50	2.50	2.35
1921.....	2.75	2.65	2.65	2.50	2.45	2.25	1.95	1.75	1.75	1.75	1.70	1.65
1920.....	3.15	3.45	3.50	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.50
1919.....	3.15	2.95	2.85	2.55	2.50	2.55	2.65	2.65	2.65	2.70	2.75	2.75
1918.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.00	3.20	3.40	4.00	4.50	4.50	4.50	4.50	4.00	4.00
1916.....	1.85	1.90	2.20	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.50	2.60
1915.....	0.95	1.05	1.10	1.15	1.15	1.15	1.20	1.25	1.30	1.35	1.50	1.70
1914.....	1.15	1.20	1.15	1.15	1.10	1.10	1.05	1.05	1.05	1.05	0.95	0.95
1913.....	1.60	1.60	1.60	1.55	1.55	1.55	1.50	1.45	1.35	1.25	1.15	1.15
1912.....	1.15	1.15	1.15	1.15	1.25	1.25	1.35	1.40	1.45	1.50	1.55	1.55
1911.....	1.30	1.30	1.25	1.20	1.20	1.20	1.20	1.20	1.20	1.15	1.15	1.15
1910.....	1.60	1.60	1.55	1.55	1.50	1.45	1.40	1.40	1.40	1.35	1.35	1.30
1909.....	1.50	1.50	1.40	1.30	1.25	1.30	1.35	1.40	1.50	1.50	1.55	1.60
1908.....	1.60	1.55	1.55	1.55	1.55	1.55	1.50	1.50	1.50	1.50	1.50	1.50
1907.....	1.80	1.80	1.80	1.80	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

Rail Steel Bars, Chicago, 1918-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.00c	2.00c	2.25c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c	2.30c
1922.....	1.60	1.50	1.50	1.55	1.65	1.65	1.70	1.80	1.95	2.00	2.00	2.00
1921.....	2.50	2.50	2.50	2.15	2.00	2.00	1.95	1.85	1.85	1.75	1.70	1.65
1920.....	2.90	3.20	3.35	3.70	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
1919.....	2.80	2.80	2.80	2.55	2.45	2.45	2.45	2.55	2.55	2.55	2.75	2.85
1918.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Market History —

No 28 Black Sheets, Pittsburgh, 1907-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	3.35c	3.35c	3.55c	3.85c	3.85c	3.85c	3.85c	3.85c	3.75c	3.75c	3.75c	3.75c
1922.....	3.00	3.00	3.00	3.10	3.15	3.15	3.15	3.25	3.40	3.50	3.35	3.30
1921.....	4.35	4.20	3.90	3.90	4.00	3.90	3.35	3.05	2.80	3.00	2.95	3.00
1920.....	5.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00	6.05	4.45
1919.....	4.70	4.70	4.60	4.35	4.35	4.30	4.30	4.35	4.35	4.35	4.35	4.35
1918.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1917.....	4.55	4.55	5.05	5.75	7.00	8.15	9.00	9.00	8.75	7.75	5.30	5.00
1916.....	2.55	2.60	2.75	2.90	2.95	2.90	2.90	2.75	2.85	3.20	3.65	4.45
1915.....	1.80	1.80	1.80	1.80	1.80	1.80	1.75	1.85	1.90	2.05	2.20	2.50
1914.....	1.85	1.95	1.95	1.90	1.85	1.80	1.80	1.90	1.95	1.95	1.90	1.80
1913.....	2.30	2.35	2.35	2.35	2.35	2.30	2.25	2.20	2.10	2.00	1.95	1.90
1912.....	1.90	1.85	1.80	1.85	1.95	1.95	2.00	2.05	2.10	2.20	2.25	2.25
1911.....	2.20	2.20	2.20	2.15	2.15	2.00	2.00	1.95	1.90	1.85	1.85	1.90
1910.....	2.40	2.40	2.40	2.35	2.30	2.25	2.20	2.20	2.15	2.15	2.15	2.15
1909.....	2.40	2.40	2.30	2.20	2.20	2.20	2.20	2.20	2.20	2.30	2.40	2.40
1908.....	2.55	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
1907.....	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60

No. 10 Blue Annealed Sheets, Pittsburgh, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.50c	2.50c	2.70c	3.15c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	2.90c
1922.....	2.25	2.25	2.25	2.35	2.40	2.40	2.40	2.45	2.50	2.60	2.60	2.50
1921.....	3.55	3.55	3.05	2.95	3.10	3.00	2.55	2.40	2.30	2.50	2.40	2.25
1920.....	4.05	5.50	5.50	4.85	5.00	5.00	5.00	5.00	5.00	5.00	4.95	3.65
1919.....	3.90	3.90	3.80	3.55	3.55	3.50	3.50	3.55	3.55	3.55	3.55	3.55
1918.....	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
1917.....	4.10	4.35	4.70	5.35	6.65	8.00	8.50	8.50	8.50	7.85	4.75	4.25
1916.....	2.45	2.60	2.85	3.00	3.05	3.10	3.00	3.00	2.95	3.15	3.30	3.90
1915.....	1.30	1.30	1.30	1.30	1.35	1.35	1.35	1.35	1.50	1.60	1.85	2.25
1914.....	1.35	1.40	1.40	1.40	1.35	1.35	1.35	1.35	1.40	1.40	1.40	1.35
1913.....	1.70	1.75	1.75	1.75	1.75	1.75	1.70	1.65	1.60	1.55	1.45	1.40

No. 28 Galvanized Sheets, Pittsburgh, 1903-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	4.35c	4.35c	4.65c	5.00c	5.00c	5.00c	5.00c	5.00c	5.00c	5.00c	4.85c	4.90c
1922.....	4.00	4.00	4.00	4.10	4.15	4.15	4.15	4.25	4.40	4.50	4.35	4.35
1921.....	5.70	5.50	5.05	4.90	5.00	4.90	4.35	4.05	3.80	4.00	3.95	4.00
1920.....	6.35	7.00	7.25	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.35	5.85
1919.....	6.05	6.05	5.95	5.70	5.70	5.65	5.65	5.70	5.70	5.70	5.70	5.70
1918.....	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25
1917.....	6.55	6.80	6.80	7.55	8.80	9.95	10.25	10.25	9.70	8.80	6.50	6.25
1916.....	4.75	4.75	4.80	4.85	4.85	4.80	4.35	4.25	4.20	4.45	5.05	6.25
1915.....	2.75	3.00	3.40	3.30	3.40	4.45	4.55	3.95	3.65	3.50	3.90	4.75
1914.....	2.85	2.95	2.95	2.90	2.80	2.75	2.75	2.85	2.95	2.95	2.85	2.80
1913.....	3.45	3.50	3.50	3.50	3.40	3.40	3.30	3.25	3.15	3.05	2.95	2.85
1912.....	3.20	3.20	3.00	3.00	3.10	3.10	3.10	3.30	3.50	3.50	3.50	3.50
1911.....	3.20	3.20	3.20	3.20	3.20	3.00	3.00	3.00	2.80	3.00	3.00	3.20
1910.....	3.70	3.70	3.70	3.70	3.50	3.20	3.20	3.20	3.20	3.20	3.20	3.20
1909.....	3.40	3.30	3 40	3.40	3.40	3.50	3.50	3.50	3.60	3.60	3.70	3.70
1908.....	3.70	3.70	3.70	3.60	3.50	3.50	3.50	3.50	3.30	3.30	3.20	3.20
1907.....	4.00	4.00	4.00	3.80	3.80	3.80	3.70	3.70	3.60	3.60	3.50	3.50
1906.....	3.60	3.60	3.70	3.80	3.80	3.80	3.80	3.90	3.80	4.00	4.00	4.00
1905.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1904.....	3.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.50
1903.....	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.50	3.50	3.50

Tin Plate, Pittsburgh, 1903-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	4.75c	4.75c	4.95c	4.95c	5.50c	5.50c	5.50c	5.50c	5.50c	5.50c	5.50c	5.50c
1922.....	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
1921.....	7.00	7.00	7.00	6.65	6.25	6.25	5.65	5.25	5.15	5.00	4.80	4.75
1920.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1919.....	7.35	7.35	7.25	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1918.....	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75	7.75
1917.....	6.90	7.00	7.50	7.50	7.90	9.25	10.00	10.00	10.00	10.00	8.20	7.75
1916.....	3.75	3.75	4.15	4.70	5.15	5.55	5.80	6.00	5.60	5.75	6.05	6.50
1915.....	3.10	3.10	3.10	3.20	3.20	3.10	3.10	3.10	3.10	3.10	3.35	3.60
1914.....	3.40	3.40	3.40	3.40	3.40	3.30	3.25	3.45	3.55	3.35	3.15	3.20
1913.....	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.55	3.50	3.40
1912.....	3.40	3.40	3.50	3.50	3.50	3.50	3.50	3.70	3.70	3.70	3.70	3.60
1911.....	3.70	3.70	3.70	3.60	3.60	3.60	3.60	3.50	3.50	3.40	3.40	3.40
1910.....	3.50	3.50	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
1909.....	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.50	3.50	3.50
1908.....	3.60	3.60	3.60	3.60	3.60	3.50	3.50	3.50	3.50	3.50	3.50	3.40
1907.....	3.90	3.90	3.90	3.90	3.80	3.80	3.70	3.70	3.70	3.60	3.60	3.60
1906.....	3.50	3.50	3.50	3.60	3.70	3.70	3.80	3.90	3.90	3.90	4.00	4.00
1905.....	3.50	3.50	3.50	3.50	3.50	3.40	3.40	3.40	3.30	3.30	3.40	3.50
1904.....	3.40	3.40	3.30	3.30	3.20	3.20	3.20	3.10	3.30	3.40	3.50	3.50
1903.....	3.80	3.80	3.90	3.90	3.80	3.80	3.70	3.70	3.60	3.60	3.60	3.50

Cold Finished Steel Bars, Pittsburgh, 1920-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.50c	2.65c	2.85c	3.00c	3.25c	3.25c	3.25c	3.25c	3.25c	3.25c	3.00c	2.90c
1922.....	2.00	1.90	1.85	1.85	2.00	2.00	2.05	2.15	2.50	2.50	2.50	2.50
1921.....	3.60	3.60	3.10	3.05	3.10	3.00	2.75	2.50	2.40	2.25	2.15	2.00
1920.....	3.65	3.85	4.50	5.25	4.40	4.50	4.10	4.55	4.25	4.10	4.00	3.60

Market History —

Plain Wire, Pittsburgh, 1915-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.45c	2.60c	2.65c	2.70c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
1922.....	2.25	2.20	2.25	2.25	2.25	2.25	2.25	2.25	2.40	2.45	2.45	2.45
1921.....	3.25	3.20	3.00	3.00	3.00	2.75	2.50	2.50	2.60	2.60	2.60	2.25
1920.....	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.20	3.25	3.25	3.25
1919.....	3.25	3.25	3.20	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.15	3.25
1918	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	2.95	2.95	3.10	3.20	3.45	3.60	3.95	3.95	3.95	3.85	3.25	3.25
1916.....	1.95	2.10	2.25	2.25	2.45	2.45	2.45	2.55	2.55	2.60	2.80	2.95
1915.....	1.30	1.35	1.40	1.40	1.35	1.35	1.40	1.40	1.55	1.60	1.70	1.90

Wire Nails, Pittsburgh, 1907-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.70c	2.75c	2.90c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c	3.00c
1922.....	2.50	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.65	2.70	2.70	2.70
1921.....	3.25	3.00	3.00	3.25	3.25	3.00	2.75	2.75	2.90	2.90	2.90	2.50
1920.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1919.....	3.50	3.50	3.45	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.45	3.50
1918.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.15	3.20	3.50	3.65	4.00	4.00	4.00	3.90	3.50	3.50
1916.....	2.15	2.20	2.40	2.40	2.50	2.50	2.50	2.60	2.60	2.65	2.85	3.00
1915.....	1.50	1.55	1.60	1.60	1.55	1.55	1.60	1.60	1.70	1.75	1.85	2.00
1914.....	1.55	1.60	1.60	1.60	1.60	1.55	1.55	1.55	1.60	1.60	1.60	1.50
1913.....	1.75	1.75	1.75	1.80	1.80	1.80	1.75	1.70	1.65	1.60	1.60	1.60
1912.....	1.55	1.60	1.60	1.60	1.60	1.60	1.60	1.65	1.70	1.70	1.75	1.75
1911.....	1.70	1.75	1.80	1.80	1.75	1.80	1.70	1.70	1.65	1.65	1.55	1.55
1910.....	1.85	1.85	1.85	1.85	1.80	1.80	1.70	1.70	1.70	1.70	1.65	1.70
1909.....	1.95	1.95	1.95	1.95	1.60	1.70	1.70	1.80	1.80	1.80	1.80	1.85
1908.....	2.05	2.05	2.05	2.05	2.05	2.00	1.95	1.95	1.95	1.95	1.95	1.95
1907.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.05	2.05

Cold Rolled Strip, Pittsburgh, 1910-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	4.50c	4.65c	4.80c	5.15c	5.25c	5.25c	5.00c	5.00c	5.00c	5.00c	5.00c	4.75c
1922.....	3.50	3.50	3.50	3.60	3.70	3.95	4.00	4.00	4.25	4.50	4.50	4.50
1921.....	6.25	6.25	5.65	5.50	5.50	5.00	4.40	3.90	3.75	3.75	3.80	3.75
1920.....	5.65	7.00	8.80	8.50	8.50	8.50	8.50	8.50	7.35	8.50	8.00	6.85
1919.....	6.25	6.25	6.10	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65
1918.....	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1917.....	6.50	6.50	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	6.50	6.50
1916.....	4.25	4.65	5.50	6.00	6.00	6.00	6.00	6.00	6.00	6.50	6.50	6.50
1915.....	2.75	2.75	2.75	2.75	2.75	2.85	2.85	3.00	3.10	3.25	3.50	3.75
1914.....	3.05	3.05	3.05	3.05	3.05	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1913.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.05
1912.....	2.95	2.95	2.95	2.95	3.00	3.05	3.05	3.05	3.05	3.15	3.20	3.25
1911.....	2.95	2.95	3.25	3.25	3.25	2.95	2.95	2.95	2.95	2.95	2.95	2.95
1910.....	....	....	....	....	....	....	2.95	2.95	2.95	2.95	2.95	2.95

Hot Rolled Strip, Pittsburgh, 1917-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.75c	2.85c	3.10c	3.30c	3.30c	3.30c	3.20c	3.15c	3.10c	3.00c	3.00c	2.75c
1922.....	2.00	1.80	1.80	1.95	2.05	2.35	2.50	2.50	2.75	2.90	2.90	2.80
1921.....	3.30	3.30	2.85	2.75	2.75	2.70	2.50	2.30	2.15	2.15	2.25	2.00
1920.....	3.70	4.80	5.25	5.45	5.50	5.50	5.50	5.50	5.50	5.50	5.00	3.90
1919.....	3.80	3.55	3.30	3.25	3.05	3.05	3.10	3.30	3.30	3.30	*3.30	*3.30
1918.....	4.50	4.50	4.50	4.50	4.25	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	....	....	....	....	....	7.25	7.25	7.25	7.00	7.00	5.25	4.50

* First quarter 1920 delivery.

Hoops, Pittsburgh, 1908-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.75c	2.85c	3.10c	3.30c	3.30c	3.30c	3.15c	3.15c	3.15c	3.15c	3.00c	2.90c
1922.....	1.95	1.85	1.80	1.95	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.45	2.40	2.30	2.25	2.20	2.15
1920.....	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.50	3.50	3.90	4.10	4.70	5.75	6.00	6.00	6.00	6.00	4.60	3.50
1916.....	2.00	2.25	2.55	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.25	3.25
1915.....	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.30	1.40	1.50	1.75	1.95
1914.....	1.40	1.30	1.30	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
1913.....	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	1.40
1912.....	1.30	1.25	1.25	1.25	1.25	1.25	1.35	1.40	1.40	1.45	1.50	1.50
1911.....	1.50	1.50	1.45	1.45	1.45	1.45	1.40	1.40	1.35	1.35	1.30	1.30
1910.....	1.60	1.60	1.60	1.60	1.50	1.55	1.55	1.55	1.50	1.50	1.50	1.50
1909.....	1.80	1.75	1.60	1.60	1.50	1.40	1.40	1.40	1.50	1.50	1.50	1.55
1908.....	2.00	2.00	2.00	2.00	2.00	1.90	1.80	1.80	1.80	1.80	1.80	1.80

Bands, Pittsburgh, 1916-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.75c	2.85c	3.10c	3.30c	3.30c	3.30c	3.15c	3.15c	3.15c	3.15c	3.00c	2.90c
1922.....	1.75	1.75	1.70	1.85	2.05	2.35	2.45	2.55	2.75	2.90	2.90	2.80
1921.....	3.05	3.05	2.70	2.75	2.75	2.70	2.35	2.20	2.20	2.25	2.15	2.00
1920.....	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1919.....	3.30	3.30	3.25	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05	3.05
1918.....	2.90	2.90	2.90	2.90	3.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1917.....	3.00	3.00	3.35	3.35	3.60	5.50	6.00	6.00	6.00	6.00	4.30	2.90
1916.....	1.85	2.05	2.35	2.50	2.50	2.50	2.50	2.60	2.60	2.60	2.75	2.90

Market History —

Angle Bars, Chicago, 1914-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c	2.75c
1922.....	2.45	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.75	2.75	2.75
1921.....	2.75	2.75	2.75	2.70	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.55
1920.....	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1919.....	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.15
1917.....	2.25	2.25	2.35	2.75	2.95	3.25	3.45	3.25	3.25	3.25	3.25	3.25
1916.....	1.50	1.50	1.50	1.50	1.90	2.00	2.00	2.00	2.00	2.15	2.25	2.25
1915.....	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1914.....	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50

Tie Plates, Chicago, 1915-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.40c	2.45c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c	2.60c
1922.....	1.90	1.85	1.75	1.80	1.85	1.85	1.85	2.00	2.20	2.35	2.35	2.35
1921.....	3.00	3.00	3.00	2.75	2.50	2.50	2.40	2.15	2.00	2.00	2.00	1.90
1920.....	2.75	2.75	2.75	2.75	2.75	2.75	2.80	3.00	3.00	3.00	3.00	3.00
1919.....	3.00	3.00	3.00	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
1918.....	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
1917.....	2.75	2.75	2.90	3.00	3.00	3.00	3.40	3.50	3.50	3.50	3.50	3.45
1916.....	1.80	2.05	2.25	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.75
1915.....	....	....	....	....	....	....	....	....	1.50	1.50	1.70	1.80

Track Bolts, Chicago, 1914-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	3.90c	4.05c	4.15c	4.25c	4.25c	4.25c	4.25c	4.25c	4.25c	4.25c	4.25c	4.25c
1922.....	3.60	3.50	3.50	3.60	3.90	3.90	3.60	3.60	3.80	3.85	3.85	3.85
1921.....	5.00	5.00	5.00	4.85	4.75	4.45	4.40	4.15	3.65	3.65	3.65	3.60
1920.....	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.75	4.95	5.00	5.00	5.00
1919.....	4.90	4.90	4.90	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
1918.....	4.90	4.85	5.05	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
1917.....	4.25	4.50	4.50	4.55	5.00	5.05	5.55	5.25	5.25	5.25	5.25	5.15
1916.....	2.60	2.65	3.20	3.25	3.25	3.25	3.25	3.25	3.25	3.60	4.20	4.25
1915.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.10	2.10	2.35	2.50
1914.....	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Railroad Spikes, Pittsburgh, 1916-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	2.85c	2.90c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.15c	3.05c
1922.....	2.25	2.15	2.05	2.20	2.25	2.30	2.25	2.30	2.80	2.80	2.75	2.75
1921.....	3.65	3.65	3.30	3.30	3.25	3.25	3.00	2.75	2.45	2.35	2.30	2.25
1920.....	3.45	3.70	3.95	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.75
1919.....	3.65	3.65	3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
1918.....	4.00	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
1917.....	3.40	3.40	3.50	3.65	3.90	4.20	4.70	6.20	6.50	6.15	5.00	4.75
1916.....	2.15	2.25	2.50	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65	3.25

Structural Rivets, Pittsburgh, 1913-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	3.00c	3.00c	3.25c	3.25c	3.25c	3.25c	3.15c	3.00c	3.00c	3.00c	2.75c	2.90c
1922.....	2.25	2.00	2.00	2.05	2.20	2.35	2.40	2.45	3.00	3.00	3.00	3.00
1921.....	4.15	3.90	3.70	3.60	3.30	3.00	2.70	2.35	2.30	2.40	2.30	2.30
1920.....	4.15	4.40	4.50	4.50	4.50	4.50	4.50	4.50	4.60	4.75	4.75	4.50
1919.....	4.40	4.20	4.20	3.70	3.70	3.70	3.70	3.90	3.90	3.90	4.00	4.05
1918.....	4.65	4.65	4.65	4.65	4.60	4.40	4.40	4.40	4.40	4.40	4.40	4.40
1917.....	4.25	4.25	4.50	4.75	5.05	5.25	5.25	5.25	5.25	5.25	5.00	4.65
1916.....	2.60	2.75	3.10	3.35	3.90	4.25	4.05	4.00	4.00	4.00	4.10	4.25
1915.....	1.45	1.45	1.45	1.45	1.45	1.50	1.50	1.50	1.60	1.75	2.30	2.45
1914.....	1.60	1.60	1.60	1.60	1.60	1.55	1.50	1.50	1.55	1.50	1.45	1.45
1913.....	2.20	2.20	2.20	2.20	2.15	2.15	2.10	2.00	2.00	1.90	1.80	1.75

Cast Iron Pipe, New York, 1918-1923

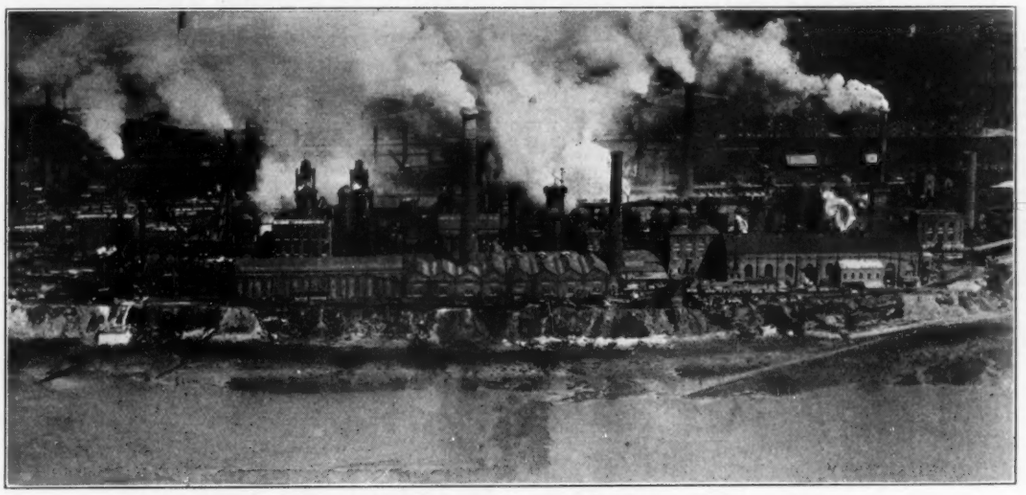
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$56.50	$57.30	$58.40	$58.70	$59.00	$59.00	$59.00	$59.20	$63.60	$63.60	$62.80	$66.60
1922.....	47.30	47.30	47.60	48.80	48.80	49.80	53.30	54.50	55.30	55.30	55.30	55.30
1921.....	63.30	63.30	63.30	63.30	61.30	52.70	48.55	47.05	45.30	47.55	47.30	47.30
1920.....	67.30	70.30	71.30	73.30	76.30	76.30	76.30	76.30	77.20	77.20	77.20	77.20
1919.....	66.20	62.70	61.65	57.70	56.70	52.70	52.70	53.10	54.30	56.70	58.30	61.30
1918.....	55.35	55.35	55.35	55.35	56.55	61.35	62.30	62.50	62.70	67.50	67.70	67.70

Cast Iron Pipe, Chicago, 1918-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$51.20	$53.20	$53.70	$55.20	$57.20	$57.20	$59.20	$60.45	$59.20	$57.95	$56.85	$59.20
1922.....	41.60	42.10	43.00	43.85	44.70	46.60	45.55	45.20	47.85	52.20	51.20	51.20
1921.....	64.10	64.10	64.10	64.10	64.10	51.50	47.60	44.35	42.90	42.60	42.60	42.60
1920.....	67.55	71.30	72.80	74.40	76.80	76.80	76.80	76.80	81.50	83.10	83.10	83.10
1919.....	64.30	61.80	60.55	56.80	54.80	51.80	52.60	54.80	55.80	59.80	59.80	63.80
1918.....	54.30	54.30	54.30	54.30	55.50	60.80	62.05	61.85	61.80	66.80	66.80	66.80

Cast Iron Pipe, Birmingham, 1918-1923

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1923.....	$43.00	$45.00	$45.50	$46.75	$49.00	$49.00	$49.00	$49.00	$49.00	$49.00	$49.00	$51.00
1922.....	35.00	34.00	33.00	34.15	34.70	37.00	37.00	37.30	40.00	43.00	43.00	43.00
1921.....	55.00	55.00	55.00	55.00	55.00	42.50	40.00	39.50	38.00	36.50	32.50	35.00
1920.....	60.00	64.50	66.00	67.00	70.00	70.00	70.00	70.00	72.40	74.00	74.00	74.00
1919.....	58.75	55.00	54.50	53.00	52.00	48.00	48.00	48.00	48.00	50.00	53.00	56.75
1918.....	49.00	49.00	49.00	49.00	50.20	55.00	55.00	55.00	55.00	60.00	60.00	60.00



Airplane View of a British Blast-Furnace Plant at Barrow Which Has Shipped Large Quantities of Pig Iron to the United States

European Market Reviews for 1923

Reports by Iron Trade Review
Staff Correspondents
Covering

Great Britain
France
Belgium
Luxemburg
Germany

Austria
Czecho-Slovakia
Hungary
Poland
Russia

European Iron and Steel Prices in 1923

British Prices in Pounds Sterling Per Gross Ton

	Jan. £ s d	Feb. £ s d	March £ s d	April £ s d	May £ s d	June £ s d	July £ s d	Aug. £ s d	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
SEMIFINISHED STEEL												
Billets, soft steel	7.10.0	8. 0.0	8.15.0	9. 5.0	8. 5.0	7.15.0	7. 5.0	7. 7.6	7. 2.6	7. 0.0	7.17.6	8. 5.0
Sheet bars	7. 7.6	8. 0.0	8.15.0	9. 5.0	8. 5.0	7.15.0	7. 5.0	7. 7.6	7. 2.6	7. 2.6	7.17.6	8. 5.0
Wire rods	10. 5.0	10.15.0	11.10.0	13.10.0	12.10.0	12.10.0	12. 5.0	10.17.6	10.17.6	10.17.6	11. 0.0	11. 0.0
FINISHED STEEL												
Steel bars, England ⅜" to 3"	9. 5.0	10. 5.0	11. 5.0	10.15.0	11. 0.0	10. 0.0	9.10.0	9.15.0	9. 5.0	9. 2.6	10. 5.0	10.10.0
Ship plates, England	9. 0.0	9.10.0	10. 0.0	10. 5.0	10. 0.0	9.15.0	9. 5.0	9. 5.0	9. 0.0	9. 0.0	9.10.0	9.10.0
Ship plates, Scotland	8.10.0	9. 0.0	9.10.0	10. 5.0	9. 0.0	9. 0.0	9. 0.0	9. 0.0	9. 0.0	9. 0.0	9.10.0	9.10.0
Beams, England	8.10.0	9. 0.0	9.10.0	10. 0.0	10. 0.0	9.10.0	9. 5.0	9. 0.0	9. 0.0	9. 0.0	9.10.0	9.10.0
Beams, Scotland	8. 0.0	8.15.0	9. 0.0	10. 0.0	9.10.0	9.10.0	9. 7.6	9. 0.0	9. 0.0	9. 0.0	9.10.0	9.10.0
Sheets, black, 24 gage	11. 0.0	12.10.0	13. 0.0	13.10.0	13.10.0	12.10.0	12.10.0	12.10.0	12.10.0	13. 0.0	13. 0.0	13. 0.0
Sheets, galvanized	18.10.0	19. 0.0	19. 5.0	19.10.0	19. 5.0	18.17.6	17.15.0	18.12.6	18.15.0	19. 5.0	19. 5.0	19. 5.0
Rails, 60 pounds and over	8. 5.0	9. 0.0	9.10.0	10. 5.0	10. 0.0	10. 0.0	9.10.0	9. 5.0	8.10.0	8.10.0	9. 5.0	9.10.0
Tin plate, base box 108 pounds	1. 0.6	1. 1.6	1. 2.6	1. 5.6	1. 4.6	1. 3.3	1.3.1½	1. 3.0	1. 3.0	1. 3.0	1. 3.6	1. 3.6
Steel hoops	11. 0.0	11.10.0	11.10.0	12.10.0	12.10.0	12. 0.0	12. 0.0	11.10.0	11.10.0	11.10.0	11.10.0	11.10.0
PIG IRON												
Hematite, East Coast, mixed nos.	4.13.6	5. 5.0	6. 0.0	6. 5.0	6. 2.6	5.17.6	5. 7.6	4.18.0	4.18.0	4.19.0	5. 0.0	5. 0.0
Hematite, West Coast, mixed nos.	5. 0.0	5. 5.0	5.15.0	6. 7.6	6. 2.6	6. 0.0	5. 5.0	5. 0.0	4.18.0	4.17.0	5. 7.6	5. 7.6
Middlesbrough basic	4. 2.6	5. 0.0	5.17.6	6. 2.6	6. 2.6	5.15.0	5.10.0	5. 5.0	4.15.0	4.14.0	4.15.0	4.15.0
No. 3 Foundry, Middlesbrough	4.12.0	5.10.0	6. 5.0	6. 7.6	6. 5.0	5.17.6	5.10.0	5. 3.0	4.17.6	4.16.0	5. 0.0	5. 0.0
No. 3 Foundry, Derby, Leicester & Nottingham	4. 5.0	4.15.0	5. 2.6	5.10.0	5.10.0	5. 5.0	5. 0.0	4.14.0	4.12.6	4.10.0	4.12.6	4.15.0
No. 3 Foundry, Northampton	4. 2.6	4.12.6	5. 2.6	5.10.0	5. .76	5. 2.6	4.17.6	4.15.0	4.10.0	4. 7.6	4.12.6	4.12.6
No. 3 Foundry, Staffordshire	4. 5.0	4.15.0	5. 2.6	5.15.0	5. 7.6	5. 5.0	4.18.0	4.18.0	4.12.6	4.11.3	4.13.6	4.15.0
No. 3 Foundry, Scotch	4.16.0	5. 5.0	5.17.6	6. 2.6	5.17.6	5.10.0	5. 7.6	5. 4.0	5. 1.6	5. 0.0	5. 1.0	5. 5.0
Ferromanganese, 76 to 80 per cent.	15. 0.0	15. 0.0	16. 0.0	18. 0.0	18. 0.0	18. 0.0	18. 0.0	18. 0.0	18. 0.0	17. 0.0	17.0 .0	17. 0.0
COKE												
Yorkshire	1. 3.0	1.10.0	1.15.0	1.10.0	1.10.0	1. 8.0	1. 6.0	1. 6.0	1. 6.0	1. 4.0	1. 4.0	1. 4.0
Foundry, Welsh	1. 7.6	1.15.0	1.15.0	1.15.0	1.15.0	1.15.0	1.15.0	1.15.0	1.15.0	1.12.6	1.12.6	1.12.6

German Prices Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept. £ s d	Oct. £ s d	Nov. £ s d	Dec. £ s d
PIG IRON												
No. 3 Foundry	365	596	668	645	662	1853	4467	100,800	5.19.2	5.16.0	5.16.0	5.16.0
SEMIFINISHED STEEL												
Wire rods	316	1050	1329	891	965	2648	6337	165,000	13. 2.0	11.12.0	10. 0.6	10. 0.0
Billets	444	988	1002	826	814	2524	7696	153,133	9. 2.4	9. 4.8	8. 1.1	8. 1.1
FINISHED STEEL												
Bars	368	1213	1238	1109	1131	3116	9343	229,560	12. 2.0	10. 2.6	9. 6.3	9. 5.0
Ship plates	415	1385	1370	1206	1275	3527	11,632	214,031	13. 0.1	11.18.11	9. 9.9	9. 3.0
Medium plates	467	1525	1564	1407	1432	2590	13,502	239,031	14. 8.8	13.15.7	10.11.6	10. 0.0
Black sheets	561	1846	1837	1588	1644	5142	16,562	287,056	17. 9.7	13.10.9	11. 0.0	11. 0.0
Tin plate	1060	3362	3970	2558	1150	....	....	....	31.13.0	32.19.3	30.10.0	31.11.8
Plain wire	412	1294	1320	1263	1278	3314	8182	227,500	20. 2.1	16.10.3	15.17.6	15.17.6
Bands and strips	425	1448	1491	1470	1547	3747	7156	308,700	15. 0.2	13. 4.2	11.18.1	11. 8.1
COKE												
Ruhr Furnace*	77	89	108	106	133	482	1792	40,131	2.10.0	2.10.0	2. 1.5	2. 1.5
Ruhr Foundry*	52	92	109	109	137	501	1800	40,131	2.10.0	2.10.0	2. 1.5	2. 1.5

* Since September, Lower Silesia. Prices Jan.-Aug. are in thousands of marks (000 omitted); Prices Sept.-Dec. are in pounds sterling.

Belgian Prices in Belgian Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Basic bessemer, Belgian	285	320	485	460	400	400	425	455	455	435	415	420
Basic open hearth, Belgian	285	325	485	545	545	545	545	490	470	460	445	440
No. 3 Foundry, Belgian	305	360	560	570	490	455	460	470	465	455	435	435
No. 3 Foundry, Luxemburg	300	350	525	585	490	445	465	470	455	435	440	440
No. 3 Foundry, Lorraine	310	350	525	560	490	445	465	470	455	445	435	430
SEMIFINISHED STEEL												
Blooms	380	440	625	625	530	505	560	595	595	565	540	540
Billets	400	480	670	680	585	535	595	635	625	590	570	570
Sheet bars	415	510	725	750	615	560	620	655	645	610	590	600
Wire rods	590	710	975	925	800	750	840	950	925	925	900	900
FINISHED STEEL												
Standard rails	500	675	725	725	725	725	700	700	700	700	750	700
Merchant bars	465	585	770	750	655	600	680	755	760	730	700	695
Normal beams and profiles	410	560	710	725	630	585	665	735	725	700	665	660
Plates, 5 mm. and thicker	490	595	785	765	700	670	715	785	800	770	745	745
Sheets, black, 3 mm.	525	630	925	885	760	715	790	860	855	825	795	795
Sheets, galvanized, 1 mm.	1570	1675	1925	1950	1850	1775	1825	1900	2000	2000	1900	1900
Plain wire	725	870	1300	1325	1250	1125	1150	1200	1250	1250	1225	1200
Galvanized wire	975	1085	1475	1500	1400	1300	1350	1450	1500	1500	1525	1500
Wire nails	750	900	1350	1375	1275	1275	1200	1250	1300	1300	1275	1250

French Prices in French Francs Per Metric Ton

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PIG IRON												
Hematite, Lorraine	325	400	550	560	505	450	430	450	490	495	470	465
Basic bessemer, Lorraine	265	335	485	505	465	405	385	400	425	440	410	410
No. 3 Foundry, Longwy, sand-cast.	255	325	475	495	455	395	375	390	415	430	400	400
No. 3 Foundry, Lorraine, chill-cast.	265	335	485	505	465	405	385	400	425	440	410	410
Ferromanganese, 76 to 80 per cent.	1120	1150	1150	1150	1150	1550	1550	1550	1500	1500	1550	1550
COKE												
French Furnace	97	123	135	135	135	135	135	135	135	135	135	135
German Furnace, f. o. b. frontier	97	130	198	P1/198 P2/310	198 310	180 250	180 250	185 250	200 250	212 250	212 225	220 233
French foundry	128	130	145	145	145	145	145	145	145	155	155	155
SEMIFINISHED STEEL												
			Open Hearth									
Blooms	360	415	600	615	575	490	490	510	535	530	500	490
Billets	400	465	630	645	620	530	530	570	585	580	535	525
Sheet bars	420	485	650	665	700	600	600	600	605	600	560	532
FINISHED STEEL												
Standard rails	550	550	550	550	550	550	600	600	600	600	600	590
Merchant bars	490	595	800	815	715	650	600	610	640	650	620	600
Angles	470	560	735	765	675	635	585	600	620	625	595	590
Normal beams and profiles	470	560	735	765	675	635	585	600	620	625	595	590
Plates, ship and tank, 10 mm. and thicker	550	595	800	880	790	725	665	655	665	670	650	660
Plates, bridge and tank, 5-10 mm.	570	620	855	920	815	745	675	670	680	680	665	675
Sheets, black, 3 mm.	610	660	895	960	855	785	715	710	720	720	705	715
Sheets, blue annealed, 2 mm.	655	695	900	1100	960	860	815	800	810	870	835	825
Shafting, cold-drawn, 40-60 mm.	850	900	1300	1400	1400	1400	1300	1250	1300	1250	1200	1150
Bars, 2 per cent nickel steel	1450	1600	1675	1675	2200	2000	1800	2050	2000	1800	1800	1800

Europe Reacts to Ruhr Events

France Becomes a World Power in Iron and Steel While Germany Reels—Amalgamation of Franco-German Interests the Problem of 1924—England Forges New Economic Weapons

BY H. COLE ESTEP

European Manager, Iron Trade Review

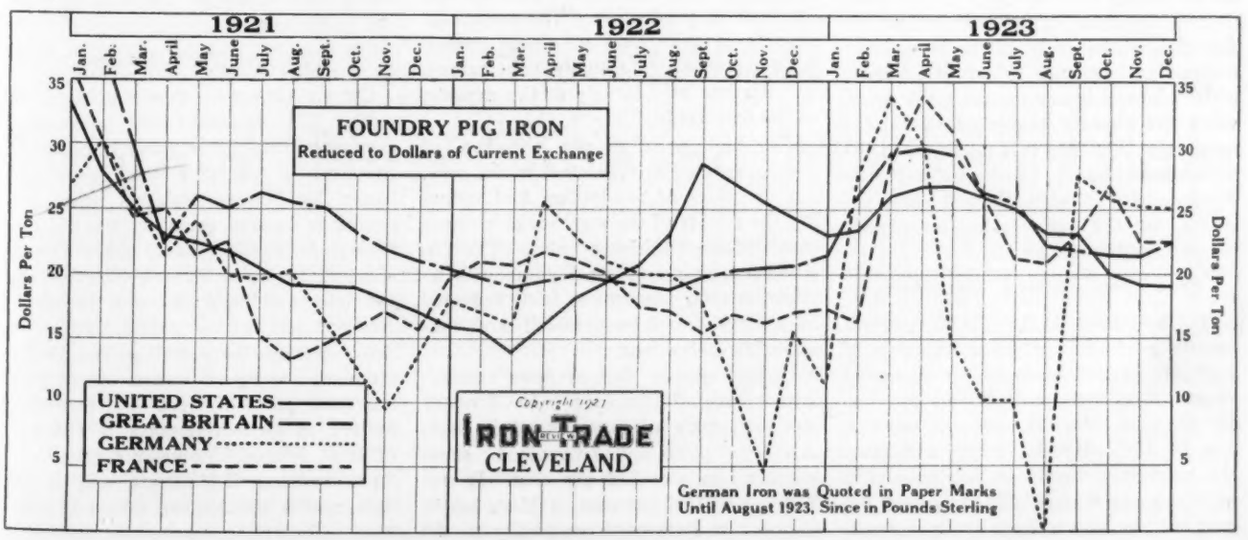
A NEW year dawns with European industry endeavoring to adjust itself to the collapse of the German government, the Franco-Belgian occupation of the Ruhr, and the prospect of fundamental changes in the time-honored tariff policies of Great Britain. In the re-alignment of business forces which is now taking place in the Old World, the coal and iron industry of the Continent is the pivot. Another year may see an entirely new iron and steel hegemony set up in Europe. The drift of events at present is clearly toward a powerful Franco-German combination allied with Luxemburg and Belgium. Such a combination would command upwards of 25,000,000 tons of ingot production annually and would naturally be pitted against Great Britain, with half that capacity but more unified and in control of sea routes and the lion's share of the export trade.

Only such a combination could challenge the supremacy in production and total volume of iron and steel business of the United States, although even it would have only half of America's great capacity. But such a merger of interests would have far reaching effects on the trade of the world. It would be a hegemony dominated by France, that is by the Comite des Forges and the prominent Lorraine iron and steel leaders. But its technical direction would remain essentially German for the simple reason that there are not nearly enough trained Frenchmen to organize the situation.

For a year past France and Germany have been engaged in a titanic struggle for the control of the railroads and the iron, steel, and coal industries lying between the two countries. The question of mere reparations has long since been lost sight of by both contestants. By military might France has forced Germany to yield and Stinnes to sign on the dotted line. Now comes the problem of re-organization.

In 1924 we shall see to what extent the Franco-German iron and steel merger becomes a reality, and to what degree it is successful in ousting Great Britain from her leadership in the world's export trade. The coal and iron industries of Lorraine and the Rhineland are potentially the most powerful in the world outside of America; but under French direction and German control of details, amid the clash of age-old national animosities, and with Germany waiting to get back her own, what prospect is there of creating an efficiently operating business machine? This question the succeeding months will answer and on the outcome hinges the course and direction of world trade for a generation.

Trade in Europe shows a tendency to expand as the new year begins. Production is increasing and prices have become fairly well stabilized. The position with reference to the American market has been reversed and American prices are more nearly on a parity with Europe than a year ago. The flow of European pig iron to American Atlantic shores has been checked, but only as a result of the severe declines in eastern markets. Neither in the Far East nor in Europe have political disturbances been able to more than check the growth of commerce. In a world distracted by postwar conflicts trade is asserting its omnipotence as a molder of destiny.



THREE YEARS OF WORLD PIG IRON PRICES

This Chart Shows Southern No. 2 Foundry at Birmingham, French Lorraine No. 3 Foundry; German No. 3 Foundry at Furnace; and British No. 3 Foundry at Middlesbrough, All Reduced to Dollars According to the Monthly Fluctuations in Exchange

British Trade Is More Active

Steel Production Is Now Above the 1913 Level and Exports Are at a High Rate—Home Market Is Dull—Sheet and Tin Plate Mills Are Actively Engaged—Tariff Becomes an Issue

BY JOSEPH HORTON
British Correspondent, Iron Trade Review

THE blight of continental politics explains chiefly why the optimism of the beginning of the year was not altogether realized in the British iron and steel industry in 1923. Next in malign influence was the boilermakers' strike in the shipyards and engineering establishments which crippled the buying power of the iron and steel industry's best customers. The boilermakers' strike is generally believed to have cost the country about $30,000,000. It lasted seven months and was finally settled in November.

On the other side of the account there were compensations in the business done in 1923 of great importance to a country which claims not without reason to be a great world provider. A glance at the export table on the following page will show that in spite of obstacles the general level of foreign shipments has been substantially above those of 1922. The peak was reached in May with a total iron and steel export, including scrap of 435,630 tons. Progress continued steadily the first five months with a slight setback in February, but since that time overseas business has generally been on a lower level, though with a steady increase from July to October. Exports of galvanized sheets, tin plate, steel rails and other staple lines of foreign business well support the claim that Great Britain is forging back towards its old position. An item of special interest to America is that relating to ferroalloys comprising chiefly ferromanganese, which showed heavy figures until April, when the exports amounted to 111,255 tons. By July they had fallen to 53,450 tons, considerably less than half the April total. October showed some increase, but the business has once more become rather mediocre.

Production Exceeds 1913 Mark

It is a remarkable fact that for several months of last year the production of steel ingots and castings far exceeded the monthly average of 1913 which was 639,600 tons. In February the tonnage was 707,100. March 802,500 and May, the maximum month in production, it, as in exports, was 821,000. July and August may be said to have brought a sort of industrial "killing frost," the latter month showing the dismal output of 567,500 tons. By October the tonnage had increased to 702,100. In view of the large business now in hand, it is not impossible that even the May figures will be exceeded by those for the end of the year.

Ruhr Policy Injurious

The economists who denounce the policy of "beggar-my-neighbor" as a means of personal aggrandizement have, on the whole, been justified by the course of the year's events. Some people welcomed the Ruhr occupation, partly in the spirit of national egotism, as the prelude to industrial progress, because of the crippling of German competition, but on the whole, the Ruhr policy has brought a good deal of injury to the British iron and steel industry. Its most direct effect has been the inflation of coke prices which for numerous makers of pig iron rendered profit making impossible. With Durham coke at £2 ($8.80) per ton delivered at Cleveland furnaces it is obviously impossible to make profits on No. 3 Middlesbrough G. M. B. selling at £4 10s ($19.75). The £6 7s 6d ($28) figure of April was an inflated price which could not be sustained. There are now signs of some laziness in coke prices, but the position will have to change radically before a number of furnaces, somewhat unfavorably located geographically, can again enter the field of production. The enormous exports of coke have no doubt proved highly profitable to many cokemakers, but this has been largely at the expense of the iron trade.

The high price of pig iron has, of course, reacted on the steel trade, forcing up costs of production and reducing the profits of the steelworks in some cases to the vanishing point. The position of iron and steel companies as profit-earning concerns is fairly reflected in their share values, which are considerably below par.

Unemployment figures have undergone some fluctuations. In January the proportion of unemployed in iron, steel, tin plate and galvanized sheet manufacture was 22.1 per cent. It was reduced to 15.3 per cent in May, but in October had reverted practically to the January position with 22.7 per cent unemployed. The alarming proportion of unemployment in shipbuilding is almost sufficient in itself to account for whatever discouraging features exist in the iron and steel trades. In January the proportion out of work was 35.6 per cent, reduced in May to 29.5 per cent, but by the end of October, no doubt on account of the boilermakers' strike, it had reached 42.6 per cent, far and away the worst showing of any department of British industry.

Selling prices call for little comment. They fairly reflect the relative position of various products. Possibly the most noticeable is the item of galvanized sheets, which after some fluctuation are back again to the position at the end of March. It is noteworthy that ferromanganese is at present dearer than it was in January and February, when export business was very much heavier. The present selling price would appear to be not altogether on a business basis.

Wage variations in the Midland iron trade represent a net advance of 15 per cent since January, making wages now 27½ per cent above the basis as compared with the maximum during the boom period of 265 per cent. Taking the iron and steel trades generally, the average weekly earnings increased from £2 16s ($12.30) in December to £2 18s 7d ($12.85) in August. Since that time slight increases in the wages of blast-furnace and steel workers have taken place, with those of ironworkers practically unchanged.

Varying Tariff Policies

Certain elements, chiefly political, interfere to some extent with a clear forecast as to 1924. The trade is especially interested in the new tariff policy initiated by Stanley Baldwin, who, proposing to reverse generally the old-time free trade system, bases his action to some extent upon his long experience in the iron and steel industry before he changed over to the political arena. As Americans are very well aware, British interests are by no means united from the tariff point of view. An important feature of British imports is the item of steel billets, blooms, etc., which in April totalled 42,019 tons, and in the dull month of August reached 39,841 tons. Shipbuilders generally are likely to oppose tariffs. On the Clyde the opinion appears to be held generally that

the shipbuilding industry owes its world pre-eminence to its ability to buy steel in the cheapest market, whether at home or abroad.

In South Wales the makers of galvanized sheets and tin plates are favorably situated for importing cheap continental semifinished steel, scrap, etc., and although some of the finest steelworks in the kingdom are situated in that area, many of them at the gates of the sheet and tin plate works, mills unattached to the steelworks are always quick to take advantage of any cheap foreign steel which may be on offer.

The tin plate and steel sheet trades have made great progress during the past year, the operating tin mills having increased from 383 to 407, and of sheet mills from 118 to 125. It is understood that other mills are in course of erection to deal with the expanding business generally looked for. These industries have, on the whole, had a good year.

The large steel companies strongly support a tariff, and their support will no doubt prove very helpful to Stanley Baldwin. But in Middlesbrough the influence of Sir Hugh Bell, an enthusiastic and active free trader who is at the head of the great Dorman Long combination, will count for something in that area, and he has on his side other leading steelmen in Sheffield and elsewhere who doubt the ultimate value of tariff restrictions in aid of trade.

Outlook Is Hopeful

Apart from political questions, the outlook seems reasonably hopeful. The recent advance in values has come at an opportune time, and has practically compelled the principal railways of the country to enter the arena of buyers. Probably all the steel plants are assured of moderately full activity for the early part of the new year, while galvanized sheet and tin plate makers will probably have a busy six months at the beginning of 1924. Substantial rail orders were given out at the end of 1923, totaling several hundred thousand tons, and a lot of bridge work is in contemplation, while a certain number of substantial undertakings at home and abroad in the way of engineering construction, water, gas and electric undertakings, etc., must absorb a good aggregate of steel. It appears that some of the foreign markets are to some extent recovering their ability to buy, although there are still complaints that British steel prices are abnormally high; and municipal and other corporations are disposed to wait, where this is at all possible, for easier prices, although such a prospect would seem to be somewhat remote.

Toward the end of last year steps were taken to revive several price-regulating associations. The Bar association has been re-established and the Steel Plate association has also been resurrected, avowedly for the purpose of securing uniform prices. So far, the efforts made in this direction have been of a very modest character. The productive capacity is now so large relative to the likely demand that all parties recognize the necessity for handling selling prices carefully. This mood is likely enough to continue, even if tariffs are imposed, in view of a capacity fully 50 per cent above that existing before the war. In this connection, the smaller number of work people now employed per ton of steel produced is a matter to be taken into consideration in connection with figures relative to unemployment. From this point of view, probably the position is really better than the percentages quoted in the foregoing might be taken to indicate.

Among the uncertain elements in the situation is the position with regard to Germany. English steelmakers are fully aware that their principal European rivals, with all their political and industrial troubles, have allowed nothing to interfere with the further development of their plants, while their great efficiency in the matter of organization is an element also to be taken into consideration. If by any means Germany should recover her ability to compete in the international market, British steelmakers will feel it.

Russia a Dark Horse

From the point of view of demand, Russia is distinctly a dark horse, baffling speculation as to her possibilities. The latest indications report that Russia wants nearly everything that Great Britain produces, and is rapidly recovering industrial and commercial stability. She may or may not be an important customer in 1924, but her possible re-entrance into the market either as a buyer or supplier of material, will have an important influence upon this year's trade.

With regard to other foreign markets, the present signs seem to point in the direction of expanding business during 1924, although all the conditions forbid any expectation of high prices or substantial profits, while boom conditions would seem to be out of the question. On the whole, a boom is not desired by the trade generally, steady progress with moderate returns being decidedly preferred.

The Real Stride in Foreign Trade

In Thousands of Gross Tons—000 Omitted

Monthly averages	Great Britain Exports	Great Britain Imports	Great Britain Steel production
1912.....	401	166	566
1913.....	414	186	639
1920.....	271	92	756
1921.....	142	137	309
1922.....	283	73	490
Jan. 1923.	353	129	634
Feb.	318	123	707
Mar.	368	110	802
Apr.	387	115	794
May	424	82	821
June	365	105	768
July	308	114	639
Aug.	324	115	567
Sept.	334	116	695
Oct.	389	106	702
Average .	357	111	709

Belgium Now Showing Marked Gains

European Staff Special

IRON and steel production in Belgium during the year 1923 considerably exceeded 1922 figures and would have been more if Belgian industries had not been unsettled by economic and political conditions. However, the output of both pig iron and steel in 1923 reached 90 per cent of the prewar level. Throughout the past year, the business situation was constantly under the influence of political events, which gave the market a general tone of uncertainty. Prices of all iron and steel commodities were distinctly higher than during the preceding year and subject to many fluctuations.

This situation can be traced back to the passive resistance of Germany following the occupation of the Ruhr district. Although the effect on the industries of Belgium have been comparatively less pronounced than in France, for Belgian coke ovens produce about twice as much coke as the French ovens do, it was the cessation of deliveries of coal and coke on the raparations account which prevented Belgium from further increasing her iron and steel production. Furthermore, Belgium has had to buy coking coal from England and other high exchange countries and coke prices were thus increased considerably. As a result, at the beginning of last year the Belgian government suspended the export of coke, allowing only a certain reduced tonnage to be sold to France, providing the latter country should furnish a corresponding tonnage of scrap to Belgium. As the year drew to a close this prohibition was withdrawn in view of improved circumstances.

The depreciation and fluctuations of the Belgian franc has had a considerable

effect on the market and it is to be noted that each fall in dollar and sterling exchange weakened the market. On the other hand export trade received an impetus from this situation and foreign competition was checked to a certain extent.

Belgian manufacturers have had to cope with labor troubles, and several wage increases have been granted to workers of all categories. There were several important strikes during the year. Furthermore, the 8-hour law is enforced in Belgium so strictly that many workers, including skilled labor, who are willing to work overtime, have been migrating to Northern France where the law is less rigorously observed. Employers in Belgium have pointed out that for this and other reasons, the strict application of the law is detrimental to industrial interests.

During the past year, Belgian imports of coke were mainly of German origin, but 46,000 tons came from the United States. Pig iron came mostly from France. Exports of coke went almost entirely to France. Pig iron was sold particularly to France and Great Britain; semifinished steel products and beams to Great Britain; rails to the Argentine Republic, Brazil and Siam; sheets to France, Great Britain, Japan, and Holland; bars to Great Britain, Germany, Argentine, India, and Japan; nails to Great Britain. During the period under review, Belgium's exports of finished steel products were only 20 to 25 per cent below prewar figures.

The fluctuations of Belgian domestic prices are shown in the table of European iron and steel prices. Special export prices have been quoted on certain iron and steel products, although in many instances the difference from domestic quotations has been small. The following quotations per metric ton will serve to illustrate this fact:

	Domestic price		Export price f.o.b. Antwerp	
Merchant Bars	Belgian francs	Dollars	Belgian francs	Dollars
Jan.	470	$23.50	450	$22.50
July	650	32.50	650	32.50
Oct. 1	745	37.25	745	37.25
Nov. 1	700	35.00	700	35.00
Rails				
Jan.	500	25.00	450	22.50
July	700	35.00	700	35.00
Oct.	775	38.75	725	36.25
Nov.	700	35.00	675	33.75

In the course of the year and after somewhat laborious negotiations, an economic agreement was arrived at between Belgium and France. A certain amount of dissatisfaction as to the results of this agreement exists among the industrialists of both countries. France is more favored by the agreement in her trade in silks and wines, but Belgium has acquired the advantage in the iron and steel trade. The agreement holds good for only one year and it is expected that it will be modified in 1924.

Export trade generally improved in Belgium up to the month of June but has since suffered a recession. Several nations have made their appearance in certain markets and have been making price concessions which have enabled them to compete successfully against Belgian manufacturers. In one case, for instance, the Belgians were competing against the United States for the award of a number of locomotives, and the American firm offered quicker delivery and better prices and captured the order. Several important Belgian firms have merged, and there is a tendency toward an extension of this movement; this should enable Belgian manufacturers to expand their export business on which the prosperity of Belgium depends to such an extent.

Although iron and steel production in Belgium has nearly reached 1913 figures again and shows a decided improvement when compared to the production of the preceding year, the outlook for 1924 is uncertain and not altogether encouraging in view of the present circumstances. Belgium is involved in the problems which are now dividing Europe, and normal operations cannot be resumed until a final settlement has been arrived at.

Central Europe Is Now Well Engaged

BY BRUNO SCHAPIRA

Central European Correspondent of Iron Trade Review

IN CENTRAL Europe the iron and steel industries are active. Exports from Czecho-Slovakia increased 266 per cent last year compared with 1922, and Austrian exports went up 32 per cent. The stagnation which prevailed at the end of 1922 yielded at the beginning of 1923 to brisker activity. Not only has the acute competition of German works ceased for the time being but considerable orders have been booked for shipment to Germany. In Austria, Czecho-Slovakia, and Polish Upper Silesia a large part of the total production is for German account. In the spring, and again in the autumn the Central European market was disturbed by strikes lasting several weeks, but fortunately no serious losses were involved.

Prices are firm and profits are being made. What will happen when German competition is renewed remains to be seen, but since everyone expects that German costs will continue to be relatively high for some time to come, Austrian and Czech producers are hopeful of being able to hold their own in a trial of strength. Bars which were being exported from Czecho-Slovakia at the beginning of 1922 for 950 to 1000 crowns ($27.55 to $29) per metric ton are now bringing 2000 crowns ($58) a ton. The Czech government has considerably reduced the coal tax, and railroad freight rates have been scaled down. Coal miners' wages also have been reduced so that if necessary considerable reductions in iron and steel prices can be made.

Face 1924 Confidently

The iron and steel industry in Austria has recovered a large share of its prewar stability and the year 1924 is faced with confidence. Partly this is due to the fact that the government's finances have been put in a healthy state as a result of the league of nations loan. Prices of finished steel rose from 150,000 to 200,000 Austrian crowns ($2 to $3) per ton early last year. Heavy orders were received from Germany for which payment was made in sterling, resulting in a further increase in finished steel prices ranging from £1 10s to £3 sterling per metric ton. The peak of the market was reached early in the summer and during the past few months competition has been increasing, resulting in a reduction in prices, bars having declined from the equivalent of $53 to $43.30 a ton. The new year opens with negotiations under way between Austrian and Czecho-Slovakian works looking toward the establishment of selling agreements covering the export markets, for the purpose of minimizing export competition between the two countries.

Hungarian steel plants have also been freed from economic pressure as a result of the advance of 1923. As in Austria and Czecho-Slovakia, prices rose until the middle of the year, when bars brought 150,000 crowns ($48.30) per ton.

Although independent politically, the iron and steel industry in Polish Upper Silesia continues to be linked with the German metallurgical system. Mill operations have been exceedingly active during the past year and capacity operations probably will continue for some time. A large share of this activity is due to the fact that tonnage is being diverted from the Ruhr.

French Producers Are Confident

Production and Exports Have Been Maintained in Spite of Great Obstacles—Business Situation Now Considered More Stable—Coke Shortages are Being Overcome—Big Price Fluctuation

BY VINCENT DELPORT

French Correspondent, Iron Trade Review

DURING the whole year 1923 the French iron and steel industry was disturbed by the effects of the Ruhr occupation. The means of compulsion to which the Franco-Belgian forces resorted to are well known. In time German industries were crippled to such a point and the mark depreciated to such an extent, that toward the end of October the resistance of Germany came to an end.

But in the meantime, French blast furnaces and steel plants suffered greatly from the shortage of coke which resulted from the shrinkage of deliveries from the Ruhr subsequent to the occupation. It is a well known fact that France depends mostly on Germany for her supply of coke; in 1922 for instance, out of 5,140,183 tons of coke which were imported into France, 4,303,324 tons were of German origin. One month after the occupation of the Ruhr, the operations of French furnaces and steel plants were reduced by 30 per cent, nearly three quarters of the furnaces operating in France under normal circumstances being situated in the regions which derive their coke from the Ruhr. Only a few plants in this district have their own coke ovens.

In order to make up for the deficiency, France has had to buy coke from other countries, mainly from England, Belgium, Holland, the Saar district, and the United States, which shipped about 140,000 tons during the first months of 1923. Belgium was naturally the most economical source of supply but this country also suffered from the nondelivery of coke from the Ruhr and therefore placed embargoes on the export of Belgian coke to other countries, France included. In the meantime the French cokeries have endeavored to increase their output.

Contracts Were Speculative

The fact that France has had to buy her fuel and other raw materials from high exchange countries has helped to depreciate the value of the franc. Sudden fluctuations in exchange rates have been prevalent during the whole year and have greatly disturbed market conditions. On several occasions the pound sterling would rise or fall over one franc in the course of a day. The dollar rate would vary in proportion. Thus it became exceedingly difficult to quote firm prices, and contracts assumed a speculative character. As a result, buyers and producers have maintained almost constantly a conservative attitude and most sales have been for spot shipment.

On the other hand the depreciation of the franc has checked foreign competition and facilitated export trade. But during the first nine months of 1923, owing to her reduced production, France was compelled to buy pig iron from the outside to a greater extent than during the corresponding period of the preceding year. Her imports of steel products were less.

Exports Are on Increase

Total iron and steel imports for the first three quarters of the year amounted to 438,637 tons worth 359,218,000 francs, compared with 496,292 tons worth 381,796,000 francs for the corresponding period of 1922. French exports of iron and steel products were smaller in tonnage than in 1922, but their value was greater owing to the higher prices which prevailed. Export trade was expanding as the past year drew to a close. France exported 1,747,627 metric tons of iron and steel products during the first nine months of 1923 valued at 1,146,745,000 francs, as against 1,956,996 metric tons and 853,927,000 francs for the corresponding period of the preceding year. Ferroalloys and scrap are not included in these figures.

Iron ore production during 1923 was satisfactory. During the first nine months the extraction of iron ore amounted to 17,110,000 tons, corresponding to a yearly output of 22,813,000 tons as against 20,832,000 tons in 1922. The Lorraine mines comprising the basins of Metz-Thionville, Briey-Longwy, and Nancy produced 94 per cent of the total output, and all iron ore from Lorraine is phosphoric. The 32 per cent Minette ore in Lorraine was quoted at about 12 francs ($0.74) per metric ton f.o.b. cars practically through the year.

The coke situation has caused much anxiety to French iron and steel producers. The average monthly receipts of reparations coke during the first nine months of 1923 amounted to 142,000 tons as against 370,000 tons in 1922. Urged by the coke shortage, the French cokeries have gradually increased their production. The monthly average up to and including September corresponds to a yearly production of 1,875,000 tons, but taking into account the new batteries of coke ovens which have been lighted since Sept. 1, the 1923 production will probably exceed 2,000,000 tons, while in 1922 barely 1,000,000 tons was reached.

At the beginning of the year, French furnace coke was sold at 97 francs ($6.75) per metric ton; following the Ruhr events the price was gradually raised until in March it reached 135 francs ($8.10), at which point it has remained. The price of German reparations coke is fixed by the Societe des Cokes de Hauts Fourneaux (S. C. O. F.). From 97 francs ($6.75) on Jan. 1, it advanced to 198 francs ($11.90) in March when deliveries were not sufficient to enable the S. C. O. F. to meet the demand. Two prices were then established, one called P1 applying to a fixed percentage of the consumers' requirements, and the other, P2 applying to any surplus tonnage. From the middle of March until the end of May price P1 was fixed at 198 francs ($11.90) and applied to only 30 per cent of the consumers' requirements; P2 was fixed at 310 francs ($18.60); in August, P1 dropped to 180 francs ($10.80) for 50 per cent of the demand and P2 dropped to 250 francs ($15); then P1 ascended again to 212 francs ($12.70) for about 60 per cent of the consumers' needs while P2 dropped to 225 francs ($13.50). During the first nine months of 1923 France imported 2,556,643 tons of coke as against 3,300,380 tons during the corresponding period of 1922. Monthly exports averaged 38,000 tons, most to Italy and Switzerland.

Coke Supply Far Short

Under normal circumstances France requires a minimum of 700,000 tons of coke a month to operate her furnaces and steel plants; the preceding figures indicate that during 1923 only about 450,000 tons per month have been obtained, including the production of the coke ovens operated by the steel plants.

Pig iron production has improved notably since August when it reached 486,250 tons. In October 514,230 tons were produced which was the highest figure registered since the beginning of the year. In spite of the coke shortage French

blast furnaces have produced a tonnage about equivalent to that of the preceding year. In 1922, production was curtailed also by coke shortage on the one hand and by the general industrial crisis on the other. This is illustrated by the fact that 116 furnaces were blowing on Jan. 1, 1923 against 73 on Jan. 1, 1922. But the complete cessation of deliveries of reparations coke which marked Germany's answer to the Ruhr occupation resulted immediately in the blowing out of many stacks in the eastern and Lorraine regions. On Feb. 1, only 90 stacks were in blast and this figure was reduced to 77 in March and April. Then the idle furnaces were gradually blown in again, although in many instances not at full capacity, and production improved until in October it exceeded the figures for December, 1922.

The price quoted for No. 3 foundry chill cast pig iron (2.50 to 3 per cent silicon) at the beginning of the year was 265 francs ($18.55) per metric ton. Quotations suddenly jumped to 345 francs ($20.70) and then to 425 francs ($25.50) in February and reached their highest level at 545 francs ($32.70) in March. After a period of weakening during which the bottom was touched in July at 380 francs ($22.80), No. 3 foundry pig iron sold at the end of the year between 400 and 425 francs ($24 to $25.50).

Concessions were made for export business. Monthly exports during the first nine months of 1923 averaged 48,500 tons and went mostly to Belgium, although a certain tonnage was sold in the United States. Imports amounted to about 5000 tons a month, especially from England.

The average monthly production of steel ingots and castings for the year 1923 amounted to 397,000 tons, exceeding the 1922 average. The semifinished steel department was active and on several occasions a number of producers went out of the market. Belgium and Luxemburg purchased a fair tonnage of blooms and billets; up to July 1, 142,000 tons were exported to these countries and another 200,000 tons went to England, Germany, the Saar district and various other markets. Reconstruction work in France has continued to absorb a considerable tonnage of shapes and bars. Activities in the rail department have been limited, the French railroads having held back their orders and having only begun to feel out the market late. Rail exports during the first half of the year amounted to 111,000 tons as against 80,451 tons for the first half of 1922. The plate department has made a poor showing on account of continued inactivity in the shipyards. The sheet market has been more brisk.

Pipe and Tube Makers Active

In the tube department, the Comptoir des Tubes Soudes par Rapprochement (butt-welded tubes) started the year by quoting 22 points discount on the French list (about 1000 francs or $60 per metric ton) f.o.b. Paris for ¾ to 2-inch sizes. The price then increased rapidly until March when quotations reached their highest point at French list plus 48 points (about 2070 francs or $124). At the end of the year quotations had dropped to an average of nine points over the list (about 1525 francs or $91) on 100-ton contracts. Tube mills have been busy throughout the year as the use of both steel and cast iron pipe is steadily increasing since the war, both for central heating purposes and modern sanitary installations. Large oil companies have also been busily engaged constructing roadside filling stations and depots at various French ports. French manufacturers of cast-iron pipe, principally the well known firm of Pont-a-Mousson appear to be developing export trade in the United States on the Pacific coast and in the West Indies.

Considering the situation generally, one is impressed with the fact that although French iron and steel producers have been laboring against great odds since the month of January when their production was considerably curtailed, they have succeeded in increasing their output to the same level as at the end of 1922. This result was facilitated by the fact that reconstruction work has been actively pursued. The large plants which were destroyed during the war, such as Senelle-Maubeuge and Longwy, the Joeuf plant of De Wendel & Co., la Marine et Homecourt and Micheville, Pont-a-Mousson, the Acieries du Nord et de l'Est, and the Societe de Denain et d' Anzin, have nearly completed their new installations.

A recent agreement of the Mission Interallies de Control des Usines et des Mines with important Ruhr industrial groups indicates general resumption of production in the occupied area as coke shipments increase. Various furnaces banked for lack of fuel then may resume production. Lower costs will result and prices will be readjusted to a better basis, which seems likely to enliven the market, many consumers apparently waiting for the situation to clear before committing themselves for future needs. Return of railroad rolling stock to the Ruhr from Germany will improve transportation and increase interchange of material. These changes in the general situation will tend to make production considerably larger and put French industry on a much better basis as to volume and costs.

Shifts in Selling Arrangements

The various Comptoirs or selling organizations which existed in 1922 have been dissolved, but they did not handle export business to any extent. Since then other syndicates have been organized among the larger firms for the export of their products; such are *Longovica, Nortrilor, Sogeco and Columeta;* another organization, the *Compagnie de Depots at Agences de Vente d'Usines Metallurgiques* was created for sale of iron and steel products to France, the French colonies and protectorates. One large iron and steel concern keeps in touch with the various markets through its connections with an important French bank which has offices and correspondents in the principal cities of the world. Schneider & Co., have entrusted certain foreign companies such as *Framericam* in the United States, with the sale of their products outside France. Furthermore, the leading French producers are quite prepared to resume negotiations with other iron and steel producing nations in order to facilitate export trade, as soon as the general situation has improved. In spite of all the difficulties which are still ahead, and although the future is uncertain, a note of confidence which was perhaps not so noticeable a year ago, can be detected.

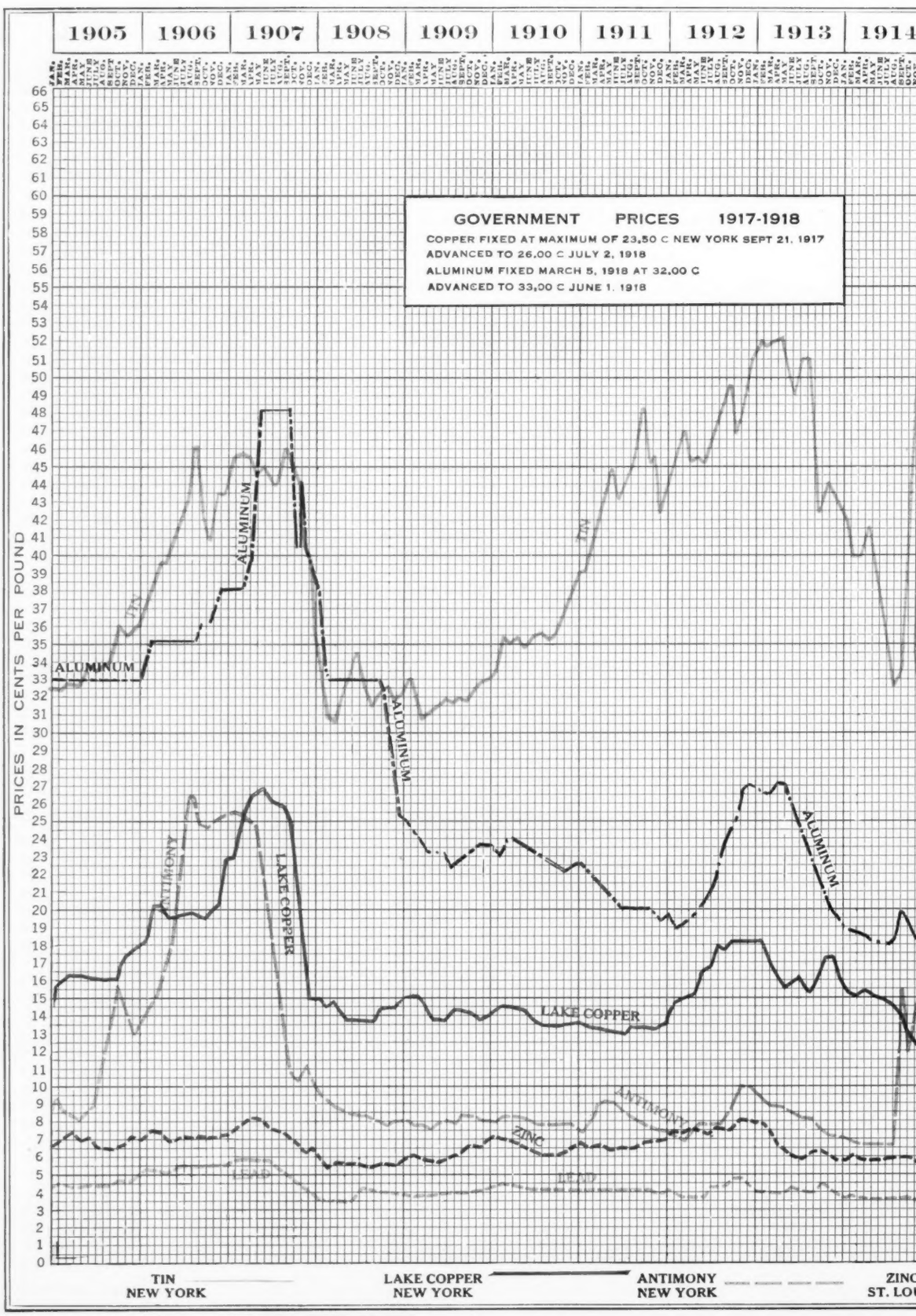
French Business Progress in 1923

	—PRODUCTION— Metric Tons 000 Omitted					IMPORTS —Metric Tons—		EXPORTS 000 Omitted		
	Iron ore	Coke	Pig iron	Steel ingots cast.	No. of furnaces in blast	Coke	Pig iron	Steel	Pig iron	Steel
Monthly aver., 1913....	3,587	333	427	385	...	...	...	...	...	...
Monthly aver., 1922....	1,736	85	436	378	...	428	5	56	60	173
January, 1923.....	2,393	132	486	408	116	404	4	50	63	147
February	1,745	122	306	290	90	165	4	55	101	180
March	1,682	149	316	316	77	127	8	27	37	119
April	1,686	156	350	355	77	244	7	32	14	111
May	1,795	162	393	399	88	383	8	29	22	141
June	1,891	161	447	427	99	378	6	48	32	125
July	1,833	178	436	400	106	302	2	50	49	143
August	1,955	181	486	452	107	274	2	51	42	173
September	1,930	182	482	446	109	280	3	51	76	167
October	....	...	514	477	111	...	...	...	...	...
November	....	...	...	...	116	...	...	...	...	...

The monthly average production of iron ore for 1913 includes the Metz-Thionville basin which was returned to France after the war, but was then German territory.

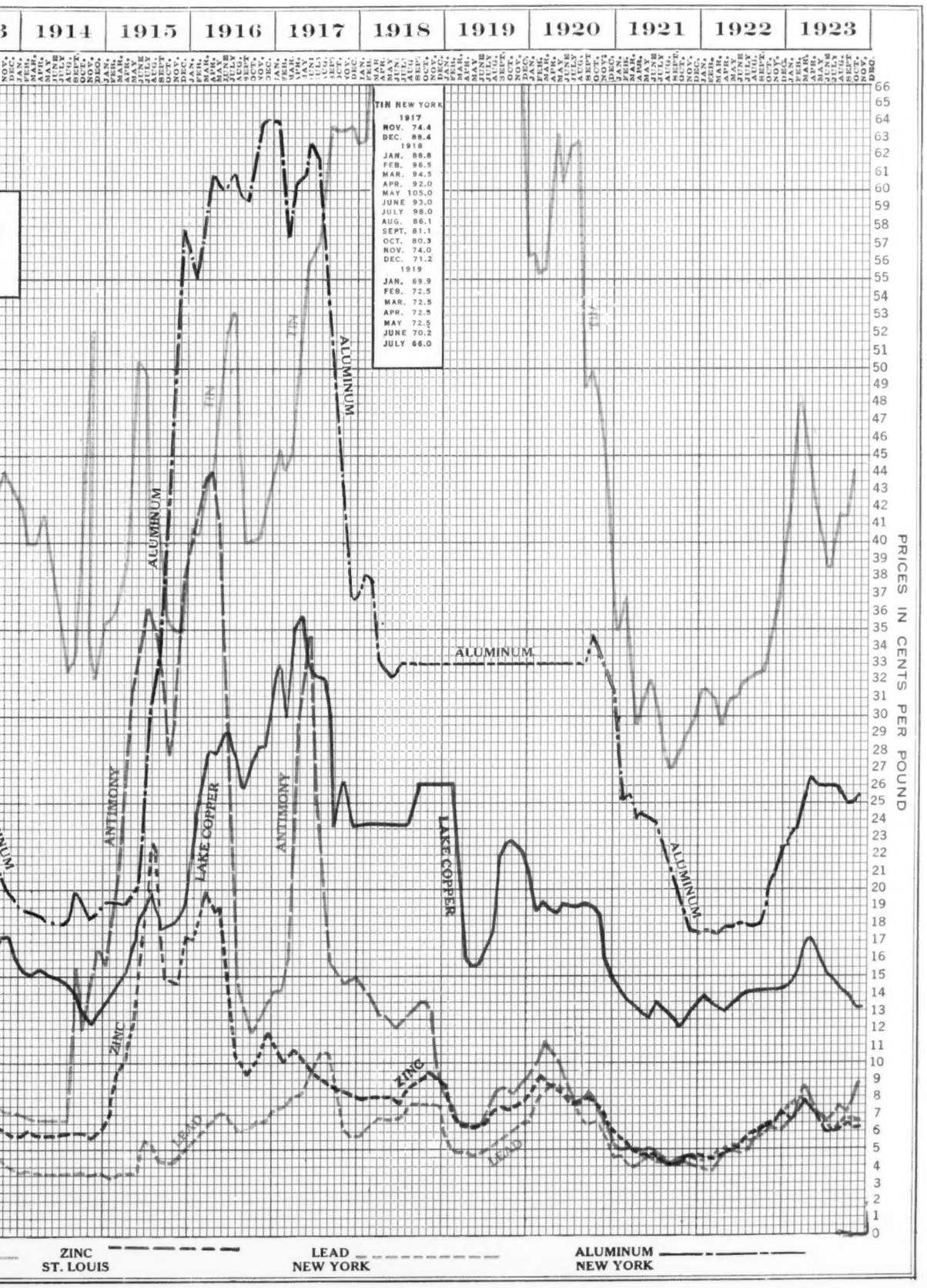
IRON T REVIE

Fluctuations in prices of pig tin, aluminum, anti



EVIEW **TRADE**

n, antimony, lake copper, zinc and lead, 1905-1923



Paris Controls Germany's Trade

Collapse of Resistance in the Ruhr Makes a Franco-German Iron and Steel Accord Necessary—Costs Are High in the Fatherland—Big Problems Await Solution

BY DR. E. H. REGENSBURGER

THE outstanding feature of the German iron and steel trade in 1923 was the struggle in the Ruhr district. The occupation isolated one of the largest iron and steel producing and consuming areas in the world during practically the entire year 1923, and probably for the greater part of this year. The French cut off the Ruhr with a customs frontier on all sides and hampered the output by bringing the railroads practically to a standstill. Previous to the occupation about 75 per cent of the Ruhr output was consumed in unoccupied Germany. Owing to the blockade great quantities of iron, steel, and coal had to be imported from abroad. On the other hand products made in unoccupied Germany which formerly had been consumed by the Ruhr district became unsalable and had partly to be dumped on foreign countries. Unproductive work and costs of production were heavily increased everywhere thus bringing German prices in some cases to above the world market.

The Mark Becomes Extinct

The occupation of the Ruhr district accelerated the end of the mark and this created further obstacles for the German iron and steel trade. About 50 per cent of the outstanding quantity of paper marks was thrown in the bottomless pit of Ruhr resistance thus depreciating the value of the mark from a rate of 7300 for $1 at the beginning of 1923 to about 10,000,000,000,000 for $1 at the end of the the year. The currency chaos resulting from this burial of the paper mark was a great hindrance.

It is not astonishing that prices and freights, expressed in paper, increased in leaps and bounds. Wages on the other hand lagged much behind so that they were lower than ever before. They became the smallest part of the cost of production and finally German iron and steel workers were getting less for their labor than any others in the world. However, not yet satisfied with this result, the German industrialists took advantage of the breakdown of the trade unions to reintroduce the 10-hour day in some cases, as they saw that the only possibility of competing abroad was by reducing their costs of production. They discharged all their employes at the end of November and reengaged on Dec. 1, only 70 per cent of their actual working forces under the condition that the men so retained would be willing to work 10 hours a day. It was stated that the remaining surplus of labor must do agricultural work in unoccupied areas.

During the first few months of last year the Ruhr output was almost normal, but by June it had decreased to about 50 per cent of the normal level. Gradually production had to be further curtailed and one mill after another was forced to close down so that after the collapse of passive resistance at the end of September almost the whole Ruhr production was stopped. At the end of October iron and steel mills in the Ruhr were operating at only about 10 per cent of capacity. This has since been increased to about 25 per cent.

In the meantime stocks of finished steel at the works increased considerably owing to the difficulty of making sales. As the works are short of coal they are producing as far as possible finished steel which contains much labor and little coal—thin wires, thin sheets, etc. Where the workers could not be otherwise occupied during the period of passive resistance, repairs and renewals which had been greatly neglected during the war and thereafter were executed. Streets and buildings were constructed, and plants brought to the highest state of mechanical efficiency.

The situation of the iron and steel industry in unoccupied Germany at the beginning of the Franco-Belgian invasion was greatly hampered by the general uncertainty and by the fact that many orders placed in the Ruhr were not filled. On the other hand after the first shock was over, many orders were placed with mills in unoccupied territory which otherwise would have gone to the Ruhr, so that this part of the German industry was soon working at full capacity. But as the year wore on production in the unoccupied area became increasingly expensive as larger quantities of coal from England and the United States, and of iron and steel from Czecho-Slovakia, Poland, Austria, England, etc., had to be bought to replace the Ruhr products. Up to April the Reichsbank succeeded in bolstering the mark which resulted in a reduction in the German level of prices and a cheapening of imports, while a decrease in home and foreign orders and a general sales crisis also resulted. On Feb. 14, the Stahlbund reduced its prices of rolled products for the first time since the war and consequently other price reductions followed. Notwithstanding, many German prices were still above the world market level and consumers were buying at an increasing rate the cheaper English and Czech steels, the importation of which was facilitated by the suspension of the German tariff on rolled products. Owing to the downward plunge of the mark in the latter part of April, German products again became cheaper than foreign goods resulting in a decrease of imports. The new mark slump during the summer caused a general revival of business and the bookings of new orders increased heavily. Wages, coal prices, and freights rose steadily and iron and steel prices were automatically adapted to these advances.

Prices on Stable Basis

As the depreciation of the mark advanced at an alarming rate the producers usually received payment for their goods in a depreciated purchasing power. Therefore, at the beginning of August the prices for hematite and foundry pig iron and all forms of steel were fixed on a value-stable basis, i. e., in paper marks at prices

Germany's Exports

Metric Tons

Commodity	1923	1922
Scrap	264,000	28,000
Bars	147,000	331,000
Ship plates	90,000	102,000
Semifinished	86,000	37,000
Wire	77,000	104,000
Pig iron	55,000	106,000
Pipe	54,000	117,000
Hollow ware	49,000	73,000
Rails	39,000	185,000
Wire nails	36,000	38,000
Thin plates	26,000	30,000
Stove castings	25,000	26,000
Domestic utensils	24,000	25,000
House hardware	20,000	27,000
Barb wire	18,000	24,000
Total, including items not specified above	1,241,000	1,645,000

which changed according to the fluctuations of the London rate of exchange. Owing to the high costs of production and freights German prices were above the world market level. In August the German Raw Iron union *(Roheisenverband)* was compelled to underbid its own maximum prices as foreign competition at home was continuously increasing and even causing some blast-furnace plants in the unoccupied area to close down. On Sept. 11, the Union of Steel Manufacturers *(Stahlbund)* fixed its prices in gold marks.

Toward the end of the year the business situation changed considerably. The demand for rolled products decreased and many orders were cancelled or postponed. On the other hand funds had become very short and consumers became cautious owing to the high prices and the low production of all industries. Labor troubles and unrest among the workmen increased as wages expressed in gold diminished every day. Exports slacked off and even the suspension of the export control over finished materials and of the export duty at the end of September made no great difference. The suspension of the coal tax, resulting in the reduction of coal prices by 30 per cent and of steels by 13 per cent in the unoccupied area exerted only a little influence on business. Steel prices in the occupied area have not been reduced materially. The costs of production in occupied territory still exceed those in other parts of Germany. Also the discontinuance of passive resistance in the Ruhr brought no revival of business. Consumers remained cautious; unemployment and short time work increased; and by the end of the year the surplus stocks in the Ruhr began to depress the market. At the end of November 20 per cent of German metal workers were without occupation and 51 per cent were working short time while at the end of September the corresponding figures were only 10 and 35 per cent.

Cannot Sell for Marks

At the end of 1923, many German iron and steel plants found themselves for the first time since the war with orders on hand for only a few weeks rolling while few new orders were coming in. Owing to the collapse of the mark most plants and traders now refuse to accept payment in paper marks and demand instead foreign exchange, German gold loan, so-called dollar treasury-bills, or the newly issued property mark which are regarded as having stable value.

In 1923 German imports had to be considerably increased in order to replace Ruhr coal and iron. During the first eight months of last year the imports of iron and steel products totaled 1,339,000 metric tons against 1,424,000 in the corresponding period of 1922. In comparing these figures it must be remembered that since February, 1923, imports into and also exports from the Ruhr have not been included owing to the expulsion of the German officials from that district, whereas 1922 figures, of course, included Ruhr imports and exports. Thus it can be stated that 1923 imports in fact were much greater than in the preceding year although the year 1923 figures include the imports from and exports to Polish Upper Silesia which for the first six months of 1922 was a part of Germany. During the first six months of 1923 26.3 per cent of the principal iron and steel products imported originated in Polish Upper Silesia, 9.4 per cent in Great Britain and 8.6 per cent in the Saar.

Imports Are Much Larger

During the first eight months of 1923—the only ones for which statistics are already available—imports of rails advanced from 68,000 tons during the corresponding period a year ago to 123,000 tons, that of semi-finished steel from 171,000 to 205,000 tons, medium plates from 10,000 to 36,000 tons and sheets from 8000 to 34,000 tons, owing to increased imports from Polish Upper Silesia. Imports of bars decreased from 446,000 to 392,000 tons, mainly owing to decreased buying from Alsace-Lorraine, Luxemburg, and the Saar, which was only partly replaced from Polish Upper Silesia and Czecho-Slovakia. Scrap imports were only 38 per cent of 1922 despite increased imports from Russia. Iron ore imports totaled only 1,791,000 tons against 7,060,000 tons, the greatest decline being in Lorraine ores. Imports of Swedish and Canadian Wabana ores increased. On the other hand imports of pig iron advanced from 173,000 to 226,000 tons owing to heavy purchases in Great Britain, Czecho-Slovakia, and Sweden. On account of the shortage of fuel coke imports rose from 132,000 to 840,000 tons, the most of this tonnage coming from the United Kingdom, and partly from the United States and Upper Silesia. As soon as the blast furnaces and mills in the Ruhr resume work the imports of ores, scrap, and pig iron will increase.

German exports of iron and steel during 1923 were much smaller than those in the preceding years as only the production of the unoccupied area was available. During the first months of the year exports were greatly hampered by the artificial bolstering of the mark, business being deprived of the usual stimulus derived from the fall of the mark. When comparing 1923 and 1922 export figures the same restrictions as mentioned above must be borne in mind. German steel imports during the first eight months of 1923 were in excess of exports for the first time since Germany became a great steel-making nation. During the first six months of 1923 12.1 per cent of the exports of finished iron and steel were shipped to Polish Upper Silesia, 11.7 per cent to Holland, 9.6 per cent to Great Britain, 8.4 per cent to Japan, 7.3 per cent to Denmark, 5.6 per cent to the Argentine and 4.5 per cent to British India. During the second six months exports to the Far East increased.

As to the outlook for German iron and steel trade there is considerable confusion. The Ruhr stocks are a big factor. According to present indications the iron and steel stocks seized by the French as compensation for unpaid coal taxes will be released and exports within the limits of the 1922 shipments will be allowed upon the payment of a moderate export duty. For it must be remembered that both the French and Germans are anxious to market the Ruhr stocks in such a way as to have little effect.

A large part of the Ruhr accumulations will be taken by German consumers. Among these especially the railroads must be mentioned. This year they did not order more than 50 per cent of their usual supplies; but in this direction the outlook is dark owing to the bad financial condition of the rail systems. Also the Ruhr district itself will need large quantities of steel to repair effects of passive resistance.

Confusion in Outlook

With these difficulties overcome it will take about two months, according to the estimates of the manufacturers in the Ruhr, before the Ruhr output will reach its normal size. But political and social conditions are such that no one can foresee what will take place. The agreement concluded at the end of November between the Ruhr mine owners and the Allied Mission de Controle des Usines et des Mines represents only the first step in the direction of a resumption of work. But it is not unlikely owing to the considerable repairs and extensions to plants which took place during the period of passive resistance, that the Ruhr output may soon exceed the average of the past few years.

Industrial Construction Increases in 1923

(*Continued from Page 39*)

the market now for many more; the Standard Sanitary Mfg. Co., which added several large units to its various plants; the Studebaker Co., which built a large plant at West Bend, Ind.; the Belle City Malleable Iron Co., Racine, Wis., etc. The last named clearly demonstrates the trend to economical construction. Its initial plant was established 30 years ago. Additions were made from time to time, but when the increased demand of 1923 was felt, the company decided to build a completely new plant incorporating every modern labor-saving and efficiency-increasing device. The plant now is declared to be a model for architectural design and plant arrangement. A. A. Wickland & Co., Chicago, was engineer.

At present general cheerfulness prevails among builders of industrial construction as heavy building programs are carried over into 1924. Many builders and engineers report an unusual amount of prospective work for this period of the year.

"Prospective business now up for 1924 is the best of any year we have ever had," states Mr. Ferguson. "Our sales in November and December usually show a decline, but this year our sales curve started up as usual in the spring, dropped in the summer and instead of falling off in November and December, it started back up again. The apparent falling off of demand in the summer might be attributed largely to the high price of labor and its unreasonable demands. A great amount of publicity was given to this situation, and it tended to kill off the market in the summer. There is more work on the architect's boards at present than there has been on them all year, and much more than is usually there at this time of the year."

Mr. Ferguson's statement is borne out by IRON TRADE REVIEW's weekly listing of structural steel contracts placed in which industrial construction awards are included.

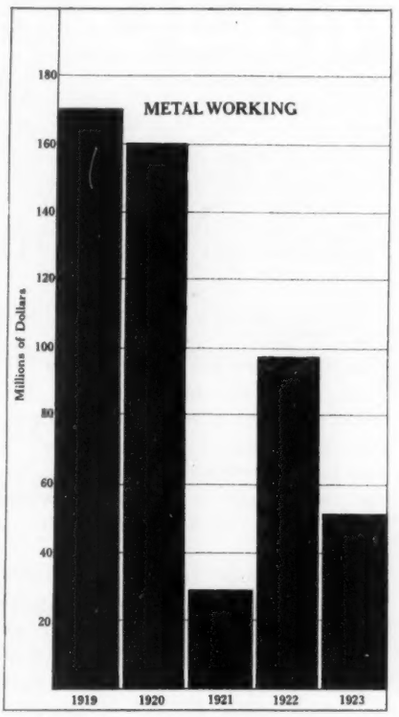
Structural steel awards for industrial construction programs were heavy in the spring, shading off gradually as midsummer was reached. The low point for the country, according to IRON TRADE REVIEW awards, was October, when but 7921 tons of steel was bought for industrial building. November buying increased with 20,441 tons being awarded. December carried along the momentum, 20,173 tons being let in the first half-month for industrial building.

Following is a comparison of tonnages of structural steel awarded in the last half of the year for industrial construction:

Month	Tons
June	27,266
July	14,112
August	20,316
September	13,843
October	7,921
November	20,441
First-half December	20,173

In commenting on the general building situation, Mr. Ferguson said:

"One of the largest problems facing engineers and builders is to try to convince their customers that the time to build is when prices are low. Our business is influenced by the stock market somewhat. When leading listed stocks are high, stockholders feel prosperous and enter the market for buildings, when prices usually have followed the stock market and materials are hard to get. They then have to pay premium prices for quick delivery of materials and bonuses to labor, when they might have saved thousands of dollars by building when prices are low."



BUILDING IN METALWORKING FIELD FROM 1919 TO 1923

Indicative of the large amount of industrial construction for which active plans already have been started and on which building is to be started during the year, are the figures compiled by the Dodge company on contemplated plants.

A total of 5436 industrial works under contemplation are listed, as compared with 4853 for the same time last year. The present figure is 45.5 per cent above the total for contracts awarded in the first 11 months of 1923. Contemplated construction represents a total of $663,697,000 capital outlay, as compared with $533,396,000 of capital expended in 1922.

Metalworking plants planned during the first 11 months of 1923 totaled 911 as compared with 691 in the like period of 1922. That most of the new buildings will be of smaller type on the average and more economical in construction is shown by the comparative cost. Contemplated work in 1923 represents an outlay of $75,786,800 as compared with $101,584,300 for 1922.

Progress in construction of central heating and power plants is indicated by the contemplated building of 382 works at an aggregate cost of $264,378,700. This total is considerably above that of 1922 when 285 plants were contemplated representing a cost of $183,457,400. For the second consecutive year, contemplated power plant construction has far outstripped all other industrial building programs in point of capital outlay.

In the various classifications of industrial construction, increases in contemplated work are registered over last year in all but food products, chemical, leather, glass and paper and pulp. The last named group has 114 buildings planned, equal to the number contemplated during 1922 for construction. Greater momentum is noted in the oil producing and refining industry, projected buildings jumping from 57 in 1922 to 72 in 1923 and cost of construction from $3,892,500 to $26,000,600. This is the greatest proportional increase in cost of contemplated construction of any of the industrial groups. Mining and quarrying industries are also expanding, total projected buildings increasing from 242 in 1922 to 287 in 1923, and the capital outlay from $21,510,400 to $39,858,700.

Overexpansion does not exist generally in any one industry throughout the country or in all industry in any one locality. Although an industry in a certain place may find itself overbuilt, at the same time another works may be hampered by lack of space. Specialization in type of construction also is stimulating building. An industrial company in opening a new plant in a city where plenty of space is available will often erect a plant of its own, incorporating special efficiency-promoting features which might not be obtainable in a leased or purchased building.

Engineers and builders are fairly unanimous in the belief that a saturation point in industrial building will not be reached so long as the United States is an industrial nation. As long as new processes are developed increasing efficiency and eliminating la-

bor charges, new buildings will be built to replace the obsolete.

Frank D. Chase, Inc., was engineer for a car wheel foundry for the Pullman Co., at Pullman, Ill., one of the most successful car foundries in the country. The plant was built in 1923.

In commenting on the saturation point of industrial building, Frank D. Chase, of Frank D. Chase, Inc., Chicago, engineer, said, "This country still is lacking adequate industrial plant capacity and it will be, in my judgment, a number of years before this is entirely taken care of. So much has been said during the past five years of the plants which were built to take care of war industries that the entire remainder of the industrial needs of the country have been overlooked and it will be some years before this demand is met."

"The trend of construction in industrial buildings," Mr. Chase said, "is to provide for better buildings with the realization that the building is an essential part of plant equipment and should function as does any other piece of machinery."

"The prospects for industrial development for the present year are good," writes A. A. Wickland, president, A. A. Wickland & Co., Inc., Chicago, engineer.

"No type of building seems to predominate," said Mr. Wickland, in discussing types of construction. "However, 1-story construction appears in favor for most industrial plants. The saturation point has not been reached in industrial building with a possible exception of the multi-story buildings. Keener competition will demand modern equipment, and the obsolete type of buildings must be replaced with new structures. We believe that during 1924 there will be considerable activity in this line."

A. A. Wickland & Co., Inc., was engineer for the Belle City Malleable Iron Co.'s new plant at Racine, Wis., an illustration of which appears in this issue of IRON TRADE REVIEW.

Although labor difficulties are being experienced in a few centers, satisfactory contracts exist between most builders and construction workers. Little hindrance is expected to occur from this phase of industrial construction during the year.

Engineers generally regard labor as having recovered from its demands for wages on the basis of those prevailing in 1920, and that contracts now in force will be complied with. Although a general increase is expected in some centers, no unreasonable wage demands or labor disturbances are anticipated. As summed up by Mr. Chase, "In general, the labor and material market is satisfactory and in our belief will continue to be so."

Producers Spend Millions for Repairs

REPORTS of the two largest steel producing organizations in the United States show that an unusually large amount of repair work on furnaces, mills and other equipment was completed in 1923 and that work still under way is extensive.

The record of construction work completed and in progress by subsidiary manufacturing companies of the United States Steel Corp. indicates that important improvements have been been made in practically every plant. At the Edgar Thomson works of the Carnegie Steel Co. a 1000-ton hot metal mixer, and a new boiler house are being constructed. The finishing end of No. 1 rail mill is being equipped for rolling and handling sheet bar. Two 75-ton open-hearth furnaces were rebuilt at the Carnegie company's Duquesne works and an improved manipulator was installed on the 40-inch blooming mill. Four 75-ton open-hearths are being rebuilt, blast furnace No. 1 is being remodeled and a shipping building is being added to the blooming mill. Open-hearth plants Nos. 1 and 2 at Homestead were repaired in 1923, the improvements consisting of new charging floors, charging machines, etc. Two 125-ton cranes are being installed in open-hearth plant No. 2 and equipment is being rearranged. A 10-ton ore bridge is being installed at the Isabella furnaces and important improvements are under way at other Carnegie plants.

At the south works of the Illinois Steel Co., a 300-ton hot metal mixer was installed in No. 2 open-hearth plant and on Dec. 31 improvements were being made to the slabbing mill.

Wet gas cleaning equipment was installed and five new stoves are being built for blast furnaces Nos. 3 and 4 at the National works of the National Tube Co. Machinery for upsetting and finishing 6-inch pipe also has been placed in operation. A new boiler house is being built at the Lorain works.

Improvements to the cold-rolling equipment at the Cuyahoga works and repairs to the ore unloaders and piers at Central furnaces and docks were the principal changes in plants of the American Steel & Wire Co.

Conveyors, galvanizing equipment, stokers, annealing furnaces and pickling machinery were added or are being added to a number of mills of the American Sheet & Tin Plate Co.

Extensive improvements and additions are listed in the report prepared by the Bethlehem Steel Corp. Additions were made to the locomotive repair shops, roll foundry, forge department, heat treating department, machine shops, tool shop, automobile wheel shop and fabricating shop at the Bethlehem plant. Changes are being made at the Saucon open-hearth plant to permit the use of coke oven gas. Rail finishing equipment is being installed in the rail mill and additional fabricating facilities are being provided in the bridge shop at the Steelton plant.

Improvements to the 40-inch blooming mill, new coke handling equipment, additional ingot cars and improved sheet finishing equipment constitute the principal changes at the Sparrows Point plant. A new stove each for "B" and "C" furnaces, a new ladle house and improvements to the 24-inch continuous mill and rail mill are under way.

The sintering plant was extended and the 10-inch mill remodeled at the Lebanon plant. Blast furnaces "B" and "G" are being enlarged.

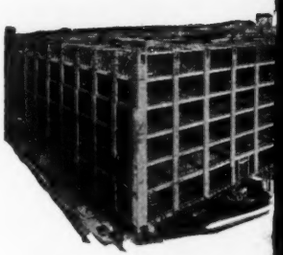
Extra ladles, cinder cars and cinder pots were added to the equipment of the open-hearth departments of the Lackawanna plant. Two new stoves are being built for blast furnace "D" and an electric drive is being applied to the 40-inch blooming mill and the 48-inch universal plate mill. The Bethlehem Land & Improvement Co. is building 300 houses for employes of the Lackawanna plant.

Coke screening and loading equipment, a tar burning system in the open-hearth department and a new motor drive on the scarfing rolls of the 22-inch skelp mill were improvements made at the Coatesville plant. The skelp yard is being extended, waste heat boilers are being applied to two furnaces serving the skelp mill and a motor drive is being erected for No. 3 plate mill.

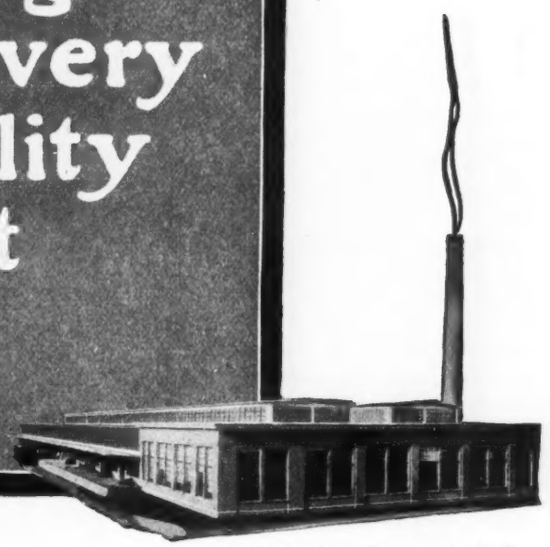
Extensive improvements, chiefly to the Rosedale coke oven department, are reported by the Cambria plant. Blast furnaces "B," "D" and "G" of the Franklin division are being improved. A 34-inch reversing billet mill complete is under construction.

The foregoing improvements and additions are supplementary to the new units mentioned in the article beginning on page 50 of this issue.

Guaranteed
~ Design
~ Delivery
~ Quality
~ Cost



Ten acres of floor space
Delco's largest building



The first Ferguson structure completed for the National Cash Register Company. Four others have followed

One Organization One Contract—*and* a Guarantee

WHEN an organization has spent years developing industrial buildings; when it has standardized and perfected them by the erection of hundreds of acres of floor space; when it can look back with satisfaction on structures completed for such exacting firms as those listed at the right,—then it can *guarantee.*

Guarantee to design and erect a permanent building, a factory, a foundry or a warehouse. Guarantee that that building, large or small, will be correct in design, of highest quality and ready for occupancy on a certain date, for a fixed sum.

The H. K. Ferguson Company is such an organization.

You can have the benefit of Ferguson service no matter where your site is located. You can buy your building complete—at wholesale—from this one organization. You can eliminate errors, save costly delays. You will find it better and cheaper to buy from Ferguson than to build yourself.

Let Ferguson prove these statements to you. It will cost you nothing to find out. Write, wire or phone today for a representative—or ask for Booklet "A."

A few of our several hundred users of guaranteed buildings

National Cash Register Co.
Dayton, O.

Procter & Gamble Co.
Cincinnati, O.

Liggett & Myers Tobacco Co.
Richmond, Va.

General Electric Co.
Schenectady, N. Y.

Cyclone Fence Co.
Waukegan, Wis.

David Lupton Sons Co.
Philadelphia, Pa.

Nordyke & Marmon
Indianapolis, Ind.

A. P. W. Paper Co.
Albany, N. Y.

Maxwell Motors Co.
Detroit, Mich.

Continental Gin Co.
Birmingham, Ala.

THE H. K. FERGUSON COMPANY
CLEVELAND
4900 Euclid Building :: Phone Randolph 6854

Ferguson
GUARANTEED BUILDINGS

Recalls Early Bessemer Days

Letter from Bessemer & Longsdon, London, Written to American Firm in 1865 Gives Sidelight on Patent and Production Problems

INTERESTING events in the early history of modern steelmaking in America center about allusions in the letter reproduced below. It was written by Bessemer & Longsdon of London, England, to Winslow, Griswold & Holley, Troy, N. Y., Aug. 5, 1865.

Alexander L. Holley, mentioned in the letter, was born at Lakeville. Conn., July 20, 1832, and died in Brooklyn, N. Y., Jan. 29, 1882. He had an important part in the American development of the bessemer process. The letter reads as follows:

4 Queen Street Place,
New Cannon Street,
London, 5 August, 1865

Messrs. Winslow, Griswold & Holley,

Gentlemen:

We are in receipt of your letter of the 19th ult. We are pleased to learn that you have concluded to purchase our patent interests in America and trust that now peace is restored in your country that the price of gold will soon be more favorable for your remittance to us.

We are very glad to find that you have such good hopes of getting over Mushet's interference and also of doing without his plans. We hope that Kelly & Shunk may soon be disposed of satisfactorily to you. We think you will certainly be able to confine those gentlemen in very restricted limits, if you do not succeed in beating them altogether.

Your manufacturing success appears to be quite as good as you can expect for the time and means at your disposal and when you have your larger machinery at work we are sure that you will do well.

We are not surprised that you have found some difficulty in making tyres. We presume that you have been trying to cast the rings for them. We have abandoned the casting and are now forging the rings out of the solid metal cast as plain ingots.

We do not remember if your Mr. Holley saw this plant at Sheffield or not, but in case he did not we would say that we first hammer out of an ingot a flat circular slab of the size and thickness required for the weight of the tyre and then punch out of the center about a 10-inch hole. Very little metal is wasted by this as the bulk of the metal is driven into the ring and only a thin piece is carried out by the end of the punch. The punched rings are then worked over the beak of an anvil under the steam hammer and the hole enlarged until they are suited for the circular tyre rolling machine where we can finish the tyres at one heat. Inclosed we send you a photograph and description of a trial of our tyres. We are getting them introduced on to various lines of railway and expect to do well with them.

In order to make the tyres very soft and tough we are using the improved alloy of manganese and iron made at Glasgow which contains about 20 per cent of manganese instead of 8 to 10 per cent as in spiegeleisen as described to you by our Mr. Bessemer.

We would recommend you to obtain some of this metal if you have not its equivalent in America and we shall be happy to get you some sent over if you desire it.

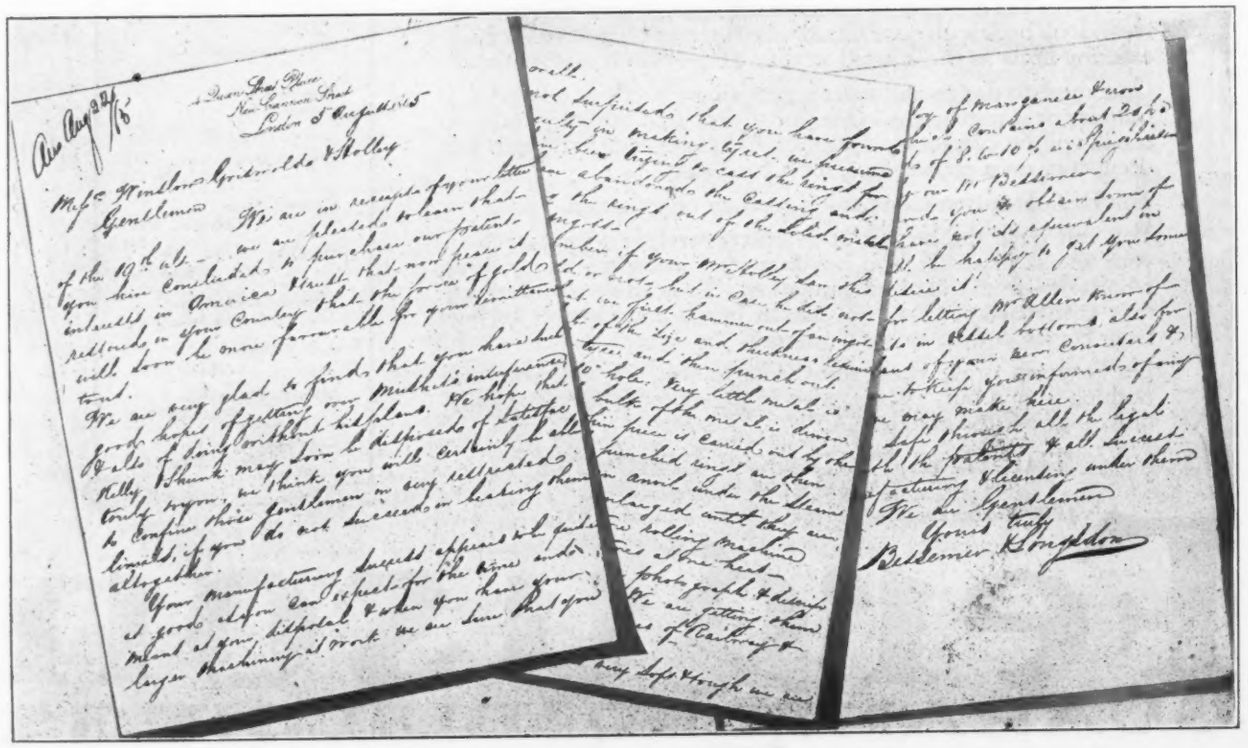
We thank you for letting Mr. Allen know of your improvements in vessel bottoms, also for the promised plans of your new converters and we will take care to keep you informed of any improvements we may make here.

Wishing you safe through all the legal difficulties with the patents and all success with the manufacturing and licensing under them

We are Gentlemen

Yours truly

Bessemer & Longsdon



Here's a Mo-lyb-den-um *Light-weight* Shovel

Averaging from six ounces to one pound lighter

MEET the world's champion light-weight—the Wood's Mo-*lyb*-den-um light-weight steel shovel.

Here is a light-weight shovel that will stand many times as much service as an old style standard gauge shovel. Yet it averages six ounces to one pound lighter.

Figure for yourself the increase in efficiency that this new shovel will bring you. It gives you a bigger day's work from every man. And it makes an immediate hit with every man who uses it.

This newest Wood's Shovel is made of Mo-*lyb*-den-um steel. It has all the strength, elasticity, toughness and long-wearing qualities of Mo-*lyb*-den-um. And to carry the quality right through, the blade is fitted with the finest double-X white ash handle. This puts the necessary weight into the handle and makes a better-balanced tool.

Write us for further information about the application of the Wood's Mo-*lyb*-den-um Shovel to all your needs.

THE WOOD SHOVEL AND TOOL COMPANY
Piqua, Ohio, U. S. A.

Wood's Mo-lyb-den-um *The American Super Steel* **Shovels**

Sheet Extras and Differentials

Reprinted from IRON TRADE REVIEW of November 15, 1923

Black Sheets

Gage Differentials

Gage	Price per 100 pounds
30 Add	$0.20
29 Add	0.10
28 (Carload quantities)	Base
27 Deduct	0.05
25-26 Deduct	0.10
22-24 Deduct	0.15
17-21 Deduct	0.20
15-16 Deduct	0.25
13-14 Deduct	0.30
10-12 Deduct	0.35

BLACK EXTRAS FOR WIDTH

Gages	Under 12 inches to 6 inches	Under 24 inches to 12 inches	24 inches to 32 inches	Over 32 inches to 36 inches	Over 36 inches to 40 inches	Over 40 inches to 44 inches	Over 44 inches to 48 inches
10 to 16	0.20	0.10	Base	Base	Base	Base	Base
17 to 18	0.25	0.15	Base	Base	0.05	0.05	0.05
19 to 21	0.25	0.15	Base	Base	0.15	0.15	0.25
22 to 24	0.25	0.15	Base	Base	0.20	0.40	0.40
25 to 27	0.30	0.20	Base	Base	0.20	0.40	...
28	0.30	0.20	Base	0.10	0.40	...	...
29 to 30	0.30	0.20	Base	0.10	...	...	...

BLACK EXTRAS FOR LENGTH

Gages	Under 30 inches to 18 inches	Under 60 inches to 30 inches	60 inches to 124 inches	Over 124 inches to 144 inches
10 to 16	0.15	0.10	Base	Base
17 to 18	0.25	0.15	Base	0.10
19 to 21	0.25	0.15	Base	0.10
22 to 24	0.25	0.15	Base	0.10
25 to 30	0.30	0.20	Base	0.10

Galvanized Sheets

Gage Differentials

Gage	Price per 100 pounds
30 Add	$0.50
29 Add	0.25
28 (Carload quantities)	Base
27 Deduct	0.15
25-26 Deduct	0.30
22-24 Deduct	0.45
17-21 Deduct	0.60
15-16 Deduct	0.75
12-14 Deduct	0.90
10-11 Deduct	1.00

STANDARD MISCELLANEOUS EXTRAS

	Extras per 100 pounds
Auto license plate stock	$0.50
Blued elbow stock	0.25
Blued range steel	0.70
Blued stove pipe stock, 25 gage and lighter	0.20
Blued stove pipe stock 24 gage and heavier	0.50
Bow socket sheets	0.75
Enameling stock, pickled and annealed finish	0.50
Deep stamping or drawing	0.25
Extra box annealing	0.15

GALVANIZED EXTRAS FOR WIDTH

Gages	Under 12 inches to 6 inches	Under 24 inches to 12 inches	24 inches to 32 inches	Over 32 inches to 36 inches	Over 36 inches to 40 inches	Over 40 inches to 42 inches	Over 42 inches to 44 inches	Over 44 inches to 52 inches	Over 48 inches to 54 inches	Over 52 inches
10 to 15	0.25	0.20	Base	Base	Base	0.10	0.20	0.30	0.40	
16	0.25	0.20	Base	Base	0.10	0.10	0.20	0.35	0.50	
17 to 18	0.30	0.20	Base	Base	0.10	0.10	0.20	0.35	0.50	
19 to 21	0.30	0.20	Base	Base	0.20	0.30	0.40	0.50	0.75	
22 to 24	0.30	0.20	Base	Base	0.20	0.40	0.60	...	...	
25 to 26	0.35	0.25	Base	Base	0.30	0.60	...	...	...	
27	0.35	0.25	Base	0.10	0.50	0.75	...	...	...	
28	0.35	0.25	Base	0.20	0.60	...	...	...	...	
29 to 30	0.35	0.25	Base	0.20	...	...	...	...	...	

GALVANIZED EXTRAS FOR LENGTH

Gages	Under 30 inches to 18 inches	Under 60 inches to 30 inches	60 to 124 inches	Over 124 inches to 144 inches	Over 144 inches to 168 inches	Over 168 inches to 180 inches	Over 180 inches to 192 inches	Over 192 inches to 216 inches	Over 216 inches to 228 inches
10 to 12	0.20	0.10	Base	Base	0.50	0.60	0.60	0.75	1.00
13 to 14	0.20	0.10	Base	Base	0.50	0.75	0.75	1.00	1.50
15 to 16	0.20	0.10	Base	Base	0.50	0.75	...	...	...
17 to 24	0.30	0.20	Base	0.10	...	...	...	...	...
25 to 30	0.35	0.25	Base	0.10	...	...	...	...	...

Blue Annealed Sheets

GAGE DIFFERENTIALS

Gage	Price per 100 pounds
8 and heavier	Less $0.05
9 and 10, carload quantities	Base
11 and 12	0.05
13 and 14	0.10
15 and 16	0.20

EXTRAS FOR WIDTH

Gage	Extra per 100 pounds
16 and heavier under 24 to 12-inch	$0.10
16 and heavier under 12 to 6-inch	0.15
16 and heavier under 24-inch and wider	None

EXTRAS FOR LENGTH

Gage	Extra per 100 pounds
16 and heavier, 60-inch and longer	None
16 and heavier, under 60 to 30-inch	0.10
16 and heavier, under 30 to 18-inch	0.15
Deoxidizing	0.15
Extra deep stamping or drawing	0.50
Full cold rolled and annealed	0.25
Full cold rolled blued stove pipe stock	0.40
Full cold rolled blued stove stock	0.60
Full cold rolled japanning stock	0.25
Full pickled, full cold rolled and annealed	0.75
Hot rolled, pickled and annealed	0.45
Liming	0.10
Locker stock	0.25
Locker stock, special	0.70
Nickel plating stock, oiled	1.50
Oiling	0.10
Patent or stretcher leveling	0.25
Range steel, black	0.50
Resquaring (5% of price of sheet at time of resquaring)	
Roller leveling	0.10
Single pickled	0.45
Single pickled, full cold rolled and annealed	0.60
Single pickled, one-pass cold rolled and annealed	0.50

Automobile Sheets

	Primes with seconds up to 15% per 100 lbs.
Auto body stock	$1.50
Auto body stock deep drawing	1.75
Auto body stock extra deep drawing	2.00
Hood, flat fender, door and apron, or splash guard stock	1.75
Crown fender, cowl and radiator casting, extra deep drawing	2.25
First grade metal furniture stock, full pickled, full cold rolled, reannealed, stretcher leveled, not resquared	1.00 to 1.15
Second grade metal furniture stock, single pickled, full cold rolled reannealed, stretcher leveled, not resquared	0.95

Price of seconds, 10 per cent less than the invoice price for corresponding primes.

EXTRAS FOR EXTREME WIDTHS

	Per 100 lbs.
10-16 gage over 36 inches to 44 inches	0.10
10-16 gage over 44 inches to 48 inches	0.35
10-16 gage over 48 inches to 52 inches	0.50
17-18 gage over 36 inches to 44 inches	0.10
17-18 gage over 44 to 48 inches	0.20 to 0.35
17-18 gage over 48 inches to 52 inches	0.60
18 gage and heavier under 24 to 12 inches	0.15
18 gage and heavier under 12 to 6 inches	0.25
19 gage and lighter under 24 to 12 inches	0.15
19 gage and lighter under 12 to 6 inches	0.25
19-21 gage over 36 inches to 44 inches	0.30
19-21 gage over 44 inches to 48 inches	0.50
22-24 gage over 36 inches to 40 inches	0.40
22-24 gage over 40 inches to 44 inches	0.80

Black sheet extras to apply on narrow widths.

EXTRAS FOR LENGTHS

	Price per 100 pounds
16 gage and heavier over 60 inches to 144 inches	Base
16 gage and heavier under 60 inches to 30 inches	$0.10
16 gage and heavier under 30 inches to 18 inches	0.15
17 to 24 gage over 24 inches to 144 inches	0.10
17 to 24 gage under 60 inches to 30 inches	0.15
17 to 24 gage under 30 inches to 18 inches	0.25
25 gage and lighter over 24 inches to 144 inches	0.10
25 gage and lighter under 60 inches to 30 inches	0.20
25 gage and lighter under 30 inches to 18 inches	0.30

Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	-Stacks- No.	In	—Output— Total	Av. daily
1907				
January	376	311	2,174,801	70,155
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,249,732	
1908				
January	398	139	1,081,813	34,897
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,718,579	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,201
October	413	309	2,589,681	83,538
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,325,099	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,768
March	417	310	2,588,736	83,508
April	418	291	2,477,700	82,590
May	419	279	2,374,802	76,607
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,791	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,416
Total			26,845,902	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,863
April	421	220	2,044,904	68,163
May	421	206	1,871,888	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,787,800	89,929
February	423	306	2,578,670	92,095
March	423	278	2,762,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,816,825	90,865
June	422	283	2,616,883	87,229
July	422	264	2,558,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,494,098	83,137
October	425	244	2,539,924	81,933
November	424	225	2,229,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	165	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,518	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	357	3,238,970	104,483
September	431	342	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	435	319	2,318,242	82,723
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,778
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,120
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,468
September	434	317	3,124,308	104,143
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,929,394	68,906
March	436	103	1,594,866	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	436	69	954,901	30,802
September	435	84	985,795	32,859
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,645,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,035,908	65,674
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827
November	428	241	2,846,110	94,870
December	428	253	3,083,520	99,468
Total			26,850,844	
1923				
January	428	261	3,228,226	104,136
February	424	278	2,993,918	106,925
March	424	295	3,523,595	113,664
April	423	311	3,547,012	118,233
May	423	322	3,868,486	124,790
June	424	322	3,667,868	122,262
July	418	299	3,684,677	118,860
August	418	270	3,448,886	111,254
September	418	254	3,117,526	103,917
October	418	245	3,142,642	101,375
November	418	231	2,891,191	96,373

Ingots and Castings

By American Iron and Steel Institute

	Ingots	Castings	Total
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797
1922	34,568,418	1,034,508	35,602,926

Monthly Ingot Output

1922	Gross Tons 84.15 per cent of capacity	Calculated total
January	1,593,482	1,891,857
February	1,745,022	2,071,772
March	2,370,751	2,814,667
April	2,444,513	2,902,240
May	2,711,141	3,218,794
June	2,634,477	3,127,775
July	2,487,104	2,952,806
August	2,214,582	2,629,256
September	2,373,779	2,818,261
October	2,872,415	3,410,265
November	2,889,297	3,430,309
December	2,779,890	3,300,416
Total	29,116,453	34,568,418
1923	95.35 per cent	
January	3,644,629	3,822,369
February	3,294,264	3,454,918
March	3,858,675	4,046,854
April	3,760,997	3,944,412
May	4,000,695	4,195,800
June	3,574,567	3,748,890
July	3,350,829	3,514,241
August	3,506,755	3,677,771
September	3,161,964	3,316,166
October	3,382,986	3,547,966
November	2,969,012	3,113,804

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.15c
New York	3.54c
Philadelphia	3.47c
Pittsburgh	3.15c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.47c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.25c
New York	3.64c
Philadelphia	3.57c
Pittsburgh	3.25c
San Francisco	3.60c
Seattle (large shapes)	3.75c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston, 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.00c
New York	3.64c
Philadelphia	3.57c
Philadelphia, 3/16-inch	3.82c
Pittsburgh	3.25c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.515c
Buffalo	4.30c
Chicago	4.00c
Cincinnati	4.10c
Cleveland	3.60c to 4.06c
Detroit	4.15c
Los Angeles	5.20c
New York	4.34c
Philadelphia	4.10c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.10c
St. Paul	4.25c

NO. 28 BLACK SHEETS

Boston	5.45c
Buffalo	5.00c
Chicago	4.70c
Cincinnati	4.90c
Cleveland	4.50c to 4.65c
Detroit	4.85c
Los Angeles	6.50c
New York	4.50c to 4.70c
Philadelphia	5.15c
San Francisco	5.80c
Seattle	6.00c
St. Louis	4.85c
St. Paul	4.95c

NO. 28 GALVANIZED SHEETS

Boston	6.60c
Buffalo	6.10c
Chicago	5.85c
Cincinnati	5.90c
Cleveland	5.60c to 5.80c
Detroit	6.00c
Los Angeles	7.30c
New York	5.50c to 5.70c
Philadelphia	6.25c
San Francisco	6.50c
Seattle	6.75c
St. Louis	6.00c
St. Paul	6.10c

BANDS

Boston	4.315c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	5.05c
New York	4.39c
Philadelphia	4.27c
Pittsburgh	3.95c
San Francisco	4.50c
Seattle	4.75c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.27c
Pittsburgh	3.95c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.35c
Boston (shapes)	4.85c
Buffalo (rounds)	4.45c
Buffalo (shapes)	4.95c
Chicago (rounds)	4.00c
Chicago (shapes)	4.50c
Cincinnati (rounds)	4.25c
Cincinnati (shapes)	4.75c
Cleveland (rounds)	4.10c
Cleveland (shapes)	4.60c
Detroit (rounds)	4.30c
Detroit (shapes)	4.80c
Los Angeles (rounds)	5.60c
New York (rounds	4.40c
New York (shapes)	4.90c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
Pittsburgh (rounds)	4.05c
Pittsburgh (sq. hex. and flats)	4.55c
San Francisco (rounds)	5.50c
Seattle (rounds)	5.50c
St. Paul (rounds)	4.25c

WELDED PIPE

Discounts from warehouse, New York City

Standard Steel Pipe

	Black	galvanized
¼-⅜-inch butt	—31	+ 2
½-inch butt	—41	—24
¾-inch butt	—46	—32
1/3-inch butt	—48	—34
3½-6-inch lap	—44	—30
7-8-inch lap	—41	—11
9-10-inch lap	—35	— 8
11-12-inch lap	—34	— 6

Wrought Iron Pipe

	Black	galvanized
¼-⅜-inch butt	+44	+78
½-inch butt	— 4	+19
¾-inch butt	—11	+ 9
1-1½-inch butt	—14	+ 6
2-inch lap	— 5	+14
3-6-inch lap	—11	+ 6
7-12-inch lap	— 3	+16

Composite Market Record

Monthly Averages of Fourteen Iron and Steel Products, 1913-1923, Compiled by Iron Trade Review

1923	
Nov.	$42.81
October	43.81
Sept.	44.64
Aug.	44.87
July	45.39
June	46.46
May	47.52
April	47.01
March	45.31
February	42.61
January	41.17
1922	
December	40.53
November	42.08
October	43.60
September	43.79
August	39.79
July	37.50
June	36.96
May	36.49
April	34.42
March	32.97
February	32.86
January	33.35
Average for year	37.86
1921	
December	33.99
November	34.71
October	35.46
September	35.34
August	35.99
July	38.14
June	41.87
May	43.32
April	43.84
March	45.37
February	48.81
January	51.98
Average for year	40.74
1920	
December	54.04
November	63.75
October	68.61
September	69.28
August	68.93
July	68.29
June	67.89
May	68.26
April	67.49
March	65.47
February	65.63
January	59.40
Average for year	65.59
1919	
December	54.88
November	51.28
October	48.76
September	48.35
August	48.27
July	47.86
June	47.88
May	48.29
April	48.45
March	52.28
February	53.71
January	53.81
Average for year	50.32
1918	
December	57.24
November	55.67
October	57.53
September	56.56
August	56.67
July	56.66
June	56.62
May	56.59
April	56.59
March	56.71
February	56.67
January	56.67
Average for year	56.68
1917	
December	56.68
November	58.29
October	67.75
September	83.18
August	89.69
July	89.56
June	82.66
May	73.96
April	66.48
March	61.07
February	56.76
January	55.10
Average for year	70.10
1916	
December	$53.68
November	46.77
October	41.50
September	39.97
August	39.67
July	38.37
June	39.63
May	39.78
April	39.13
March	37.18
February	35.63
January	33.66
Average for year	40.50
1915	
December	31.56
November	28.64
October	26.19
September	25.55
August	24.77
July	24.25
June	23.74
May	22.89
April	22.66
March	22.71
February	22.21
January	21.90
Average for year	24.76
1914	
December	$21.58
November	23.39
October	22.84
September	23.17
August	22.72
July	22.17
June	22.58
May	22.99
April	23.39
March	23.60
February	23.52
January	23.03
Average for year	22.92
1913	
December	23.29
November	24.02
October	24.91
September	25.55
August	25.97
July	26.34
June	26.78
May	27.34
April	27.74
March	27.93
February	28.05
January	27.96
Average for year	26.32

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago**
San Francisco
Cincinnati **Detroit**

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range bessemer, 55 per cent iron. $6.45
Mesabi bessemer, 55 per cent iron. 6.20
Old Range nonbessemer, 51½ per cent iron 5.70
Mesabi nonbessemer, 51½ per cent iron 5.55

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent 10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent 13.25 to 16.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent 9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent 10.00 to 10.50
Swedish and Norwegian low phosphorus, 68 per cent 11.00 to 12.00
Swedish foundry or basic, 66 to 68 per cent 9.25 to 10.00
Spanish foundry or basic, 50 to 54 per cent 9.00

Manganese Ores

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent. 40 to 42 cents c.i.f. tidewater
Indian, minimum 47 per cent. 40 to 42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent. 41 cents c.i.f. tidewater

Fluor Spar

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton. $19.00 to $23.50
Washed gravel, imported, duty paid eastern tidewater, per net ton $20.00 to 21.00

Rivets

Structural rivets, Pittsburgh 2.90c
Rivets, 7/16-in. and smaller. 65, 10 and 5 off

Nuts and Bolts

(Up to 1¾ and 1½ inches inclusive)

Hot pressed square or hexagon blank $4.50 off list
Hot pressed square or hexagon tapped $4.50 off list
Cold punched square or hexagon blank $4.00 off list
Cold punched, square or hexagon $4.00 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger 75 and 5 off
Cold punched semifinished hexagon nuts 9/16-inch and smaller 80 and 5 off
Price f.o.b. Pittsburgh, packages of 50.

CARRIAGE BOLTS
(¾ x 6 inches, smaller and shorter)

Rolled thread 60 and 10 off
Cut thread 60 off
Larger and longer 60 off

MACHINE BOLTS
(⅜ x 4 inches, hot pressed nuts)

Rolled thread 60 and 10 off
Cut thread 60 and 10 off
Larger and longer 60 and 10 off
((⅜ x 4 inches, cold punched nuts)
Cut thread 50, 10 off
Larger and longer 50, 10 off
Lag screws 65 and 10 off
Plow bolts Nos. 1, 2 and 3 heads 50 and 10 off
4 to 10 heads 50-10 + 20 off
Flat and round head stove bolts 75, 10 and 5 off
Other stove bolts 75 and 5 off
Tap bolts 25 and 10 off
Bolt ends with hot pressed nuts 60 and 10 off
Bolt ends with cold punched nuts 50 and 10 off
Blank bolts 60 and 10 off
Rough stud bolts with nuts 50 off

WASHERS

Wrought washers $5.00 to $5.50 off

Steel Pipe

(Effective April 19, 1923)
Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½
Lap Weld		
2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	60	48½
Lap Weld		
2-inch	53	41½
2½ to 6-inch	57	45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½
Lap Weld		
2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½
Lap Weld		
2-inch	41	32½
2½ to 4-inch	43	34½
4½ to 6-inch	42	33½
7 to 8-inch	38	25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)
Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS		
Butt Weld		
⅛ and ¼-inch	+11	+29
⅜-inch	22	2
½-inch	28	11
¾-inch	30	13
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
3 to 6-inch	28	13
7 to 12-inch	26	11
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
⅛ and ¼-inch	+19	+54
⅜-inch	21	7
½-inch	28	12
¾-inch	30	14
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)
(Effective April 19, 1923)

2 and 2¼-inch 23 off
2½ and 2¾-inch 33 off
3-inch 36 off
3¼ to 3¾-inch 38½ off
4 to 13-inch 42 off

CHARCOAL IRON
(Effective April 12, 1923)

1½-inch +22
1¾-inch +12
2 and 2¼-inch + 2
2½ to 3-inch 3
3¼ to 4½-inch 5

SEAMLESS COLD DRAWN
(Effective April 19, 1923)

1-inch 51 off
1¼ and 1½-inch 43 off
1¾-inch 27 off
2 and 2¼-inch 18 off
2½ and 2¾-inch 28 off
3 and 3¼-inch 32 off
3½ and 3¾-inch 33 off
4-inch 37 off
4½ and 5-inch 29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch 34 off
3½ and 3¾-inch 35 off
4-inch 39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

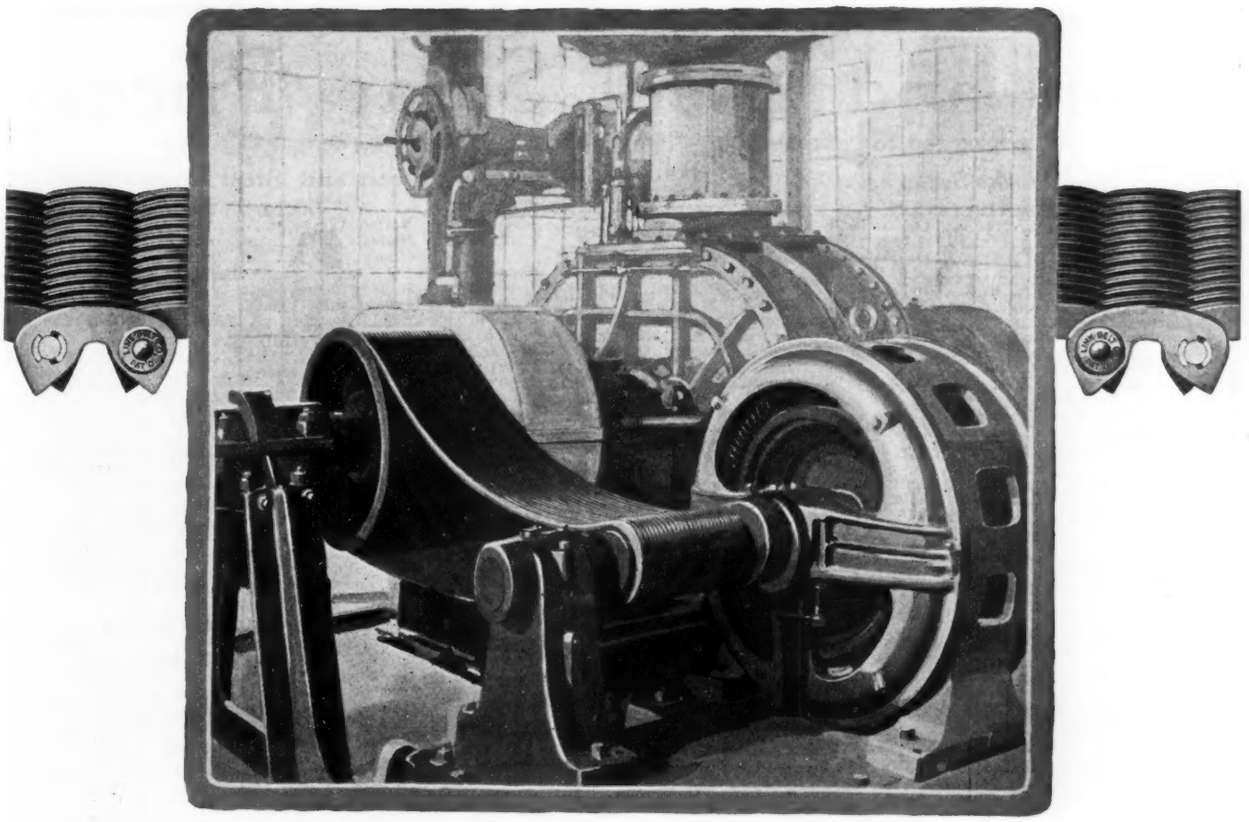
SEAMLESS STEEL MECHANICAL TUBING
Base Discounts

Carbon, 0.10 to 0.20 per cent. 83 off
Carbon, 0.30 to 0.40 per cent. 81 off
Carbon, 0.40 to 0.50 per cent. net price
Plus differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES
(Effective April 19, 1923)

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	15c
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.



You can do much to inform yourself on elevating, conveying and power transmission methods and equipment by reading these books. Sent gratis on request.

Chain the Motor to the Machine

DON'T waste power—

Drive your machine and line-shafting with this 98.2% efficient Link-Belt Silent Chain Drive.

It is flexible as a belt—positive as a gear—more efficient than either.

It has earned an enviable reputation as the "Ideal" Drive in all lines of power transmission. And when enclosed in our patented oil-retaining, dust-proof casing it makes a real "safety-first" factory drive for machine tools, pumps, blowers, compressors; in fact, for every type of machine.

We sell each drive complete, and guarantee its performance.

Let our experienced power transmission engineers show you how to use this compact and efficient drive in your work.

The books illustrated will give those interested a good idea of the entire Link-Belt line of chains and elevating and conveying machinery. Copies sent on request.

1410-A

LINK-BELT COMPANY

PHILADELPHIA
2045 Hunting Park Ave.

CHICAGO
300 W. Pershing Road.

INDIANAPOLIS
501 N. Holmes Ave

Branches in Industrial Centers

LINK-BELT
SILENT CHAIN DRIVES

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	12.00 to 13.00
Boston (dealers)	12.00 to 13.00
Buffalo	17.50 to 18.00
Chicago	17.00 to 17.50
Cleveland	16.50 to 17.00
Cincinnati	14.50 to 15.00
Detroit (dealers)	14.50 to 15.00
Eastern Pennsylvania	16.75 to 17.50
New York (dealers)	12.50 to 13.00
Pittsburgh	19.00 to 19.50
St. Louis	17.50 to 18.00
Valleys (nominal)	17.75 to 18.25
No. 1 railroad steel New York (dealers)	13.50 to 14.00

COMPRESSED SHEETS

Buffalo	15.50 to 16.00
Chicago	13.50 to 14.00
Cleveland	14.00 to 14.25
Detroit (dealers)	13.00 to 13.50
Pittsburgh	17.50 to 18.00
Valley	15.75 to 16.25

BUNDLED SHEETS

Buffalo	10.50 to 11.00
Cincinnati	11.50 to 12.00
Cleveland	12.00 to 12.25
Detroit	9.00 to 10.00
Eastern Pennsylvania	14.50 to 15.00
Pittsburgh	16.00 to 16.50
St. Louis	10.50 to 11.00
Valley	14.00 to 14.25

SHEET CLIPPINGS, LOOSE

Chicago	8.50 to 9.00
Detroit	8.00 to 8.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston (dealers)	12.00 to 13.00
Chicago	19.50 to 20.00
Cincinnati	19.00 to 19.50
Cleveland	15.50 to 15.75
St. Louis	20.00 to 20.50

STOVE PLATE

Birmingham	14.00 to 15.00
Boston (consumers)	15.00 to 16.00
Buffalo	18.00 to 18.50
Pittsburgh	16.00 to 16.50
Chicago	19.50 to 20.00
Cincinnati (net iron)	13.00 to 13.50
Cleveland	18.00 to 18.50
Detroit (net ton) (dealers)	14.50 to 15.00
Eastern Pennsylvania	17.00 to 17.50
New York (dealers)	12.50 to 13.00
Pittsburgh	16.00 to 16.50
St. Louis	18.00 to 18.50

LOW PHOSPHORUS

Buffalo	20.00 to 21.00
Cincinnati	15.00 to 15.50
Eastern Pennsylvania	21.00 to 22.00
Pitts., Billets and bloom crops	23.50 to 24.00

SHOVELING STEEL

Chicago	16.75 to 17.25
Pittsburgh	15.00 to 15.50
St. Louis	17.00 to 17.50

KNUCKLES, COUPLERS, SPRINGS

Chicago	20.50 to 21.00
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.50 to 22.00
St. Louis	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	17.00 to 17.50
Eastern Pennsylvania	16.75 to 17.00
St. Louis	18.50 to 19.00

BOILER PLATE, CUT

St. Louis	11.75 to 12.25

ANGLE BARS—STEEL

Chicago	18.75 to 19.25
St. Louis	18.00 to 18.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	14.00 to 14.50
Boston (dealers)	13.00 to 14.00
Buffalo	15.00 to 15.50
Cleveland, No. 1	14.50 to 15.00
Chicago No. 1	17.50 to 18.00
Chicago, No. 2	17.00 to 17.50
Cincinnati, No. 1	13.50 to 14.00
Detroit, No. 2	14.50 to 15.00
Eastern Pennsylvania	18.00 to 20.00
New York, No. 1 (dealers)	14.50 to 15.00
Pittsburgh, No. 1	15.00 to 15.50
Pittsburgh, No. 2	19.00 to 19.50
St. Louis, No. 1	16.00 to 16.50
St. Louis, No. 2	17.00 to 17.50

WROUGHT PIPE

Boston (dealers)	10.50 to 11.00
Buffalo	12.00 to 12.50
Eastern Pennsylvania	16.00 to 17.00
New York (dealers)	11.50 to 12.00

YARD WROUGHT

Boston	12.00 to 13.00
Eastern Pennsylvania	17.00 to 18.00

CITY WROUGHT

New York, long	12.50 to 13.00

BUSHELING

Buffalo	15.50 to 16.00
Chicago, No. 1	14.00 to 14.50
Chicago, No. 2	8.50 to 9.00
Cincinnati, No. 1	11.50 to 12.00
Cleveland, No. 1	12.50 to 12.75
Cleveland, No. 2	10.00 to 10.25
Detroit, No. 1	12.50 to 13.00
Detroit, No. 2 (new)	12.00 to 12.50
Detroit, No. 2 (old)	9.00 to 10.00
Eastern Pennsylvania	16.00 to 17.00
Pittsburgh, No. 1	15.50 to 16.00
St. Louis, No. 1	16.00 to 16.50

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston (dealers)	9.50 to 10.00
Buffalo	12.00 to 12.50
Chicago	9.00 to 9.50
Cincinnati	10.50 to 11.00
Cleveland	12.75 to 13.00
Detroit (dealers)	10.50 to 11.00
Eastern Pennsylvania	14.50 to 15.00
New York (dealers)	9.50 to 10.00
Pittsburgh	14.50 to 15.00
St. Louis	9.50 to 10.00
Valleys	12.75 to 13.25

CAST IRON BORINGS

Birmingham (chemical)	16.00 to 17.00
Birmingham (plain)	8.00 to 9.00
Boston (chemical)	10.50 to 11.00
Boston (dealers)	9.00 to 9.50
Buffalo	13.00 to 14.00
Chicago	12.50 to 13.00
Cincinnati	11.50 to 12.00
Cleveland	13.50 to 13.75
Detroit (dealers)	11.00 to 11.50
Eastern Pennsylvania (chem.)	15.00 to 16.00
Eastern Pennsylvania	14.00 to 15.00
New York (dealers' price)	9.50 to 10.00
Pittsburgh	15.50 to 16.00
St. Louis	13.00 to 13.50
Valleys	14.25 to 14.75

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	8.50 to 9.00
Cleveland	13.75 to 14.00
Detroit (dealers)	10.50 to 11.25
Eastern Pennsylvania	12.00 to 13.00
New York (dealers)	9.25 to 9.75

IRON AXLES

Birmingham	20.00 to 21.00
Boston (consumers)	31.00 to 32.00
Buffalo	28.00
Chicago	29.00 to 29.50
Cincinnati	23.00 to 23.50
Eastern Pennsylvania	25.00 to 30.00
New York (dealers)	25.50 to 26.00
St. Louis	28.00 to 28.50

IRON RAILS

Buffalo	18.00 to 19.00
Chicago	19.50 to 20.00
Cincinnati	15.00 to 15.50
St. Louis	17.50 to 18.00

PIPES AND FLUES

Chicago	12.00 to 12.50
Cincinnati	10.00 to 10.50
Cleveland	12.50 to 13.00
St. Louis	12.50 to 13.00

RAILROAD GRATE BARS

Buffalo	16.50 to 17.00
Chicago	18.25 to 18.75
Cleveland	18.00 to 18.50
Eastern Pennsylvania	17.50 to 18.50
New York (dealers)	14.00 to 14.50
St. Louis	17.00 to 17.50

FORGE FLASHINGS

Boston (dealers)	9.00 to 10.00
Chicago, small	11.50 to 12.00
Cleveland, small	12.75 to 13.00
Cleveland, large	12.75 to 13.00
Detroit (dealers)	11.00 to 11.50

FORGE SCRAP

Boston (dealers)	9.00 to 10.00
Chicago	17.00 to 17.50
Eastern Pennsylvania	14.50t o 15.00

ARCH BARS AND TRANSOMS

Chicago	24.00 to 24.50
St. Louis	22.00 to 22.50

ANGLE BARS—IRON

Chicago	23.50 to 24.00
St. Louis	22.00 to 22.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	9.50 to 10.00
Buffalo	13.50 to 14.00
Chicago	13.50 to 14.00
Cleveland	14.00 to 14.25
Eastern Pennsylvania	14.00 to 15.00
Pittsburgh	17.50 to 18.00
St. Louis	13.00 to 13.50

STEEL CAR AXLES

Birmingham	17.00 to 18.00
Boston (consumers)	18.00 to 20.00
Buffalo	17.00 to 17.50
Chicago	20.50 to 21.00
Cleveland	19.00 to 20.00
Eastern Pennsylvania	21.00 to 23.00
New York (dealers)	15.00 to 15.50
Pittsburgh	21.50 to 22.00
St. Louis	20.00 to 20.50

SHAFTING

Boston (consumers)	20.00 to 21.00
Chicago	23.50 to 24.00
Eastern Pennsylvania	21.50 to 22.50
New York (dealers)	14.50 to 15.00
St. Louis	20.00 to 20.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	15.50 to 16.50
Birmingham, iron	15.00 to 16.00
Boston (consumers)	20.00 to 21.00
Buffalo	18.50 to 19.00
Chicago, iron	20.00 to 20.50
Cincinnati	14.50 to 15.00
Eastern Pennsylvania	19.50 to 20.50
New York iron (dealers)	15.50 to 16.00
Pittsburgh, iron	21.00 to 21.50
Pittsburgh, steel	21.50 to 22.00
St. Louis, iron	18.50 to 19.00

NO. 1 CAST SCRAP

Birmingham, cupolla	18.50 to 19.00
Boston (consumers)	22.00 to 23.00
Buffalo	19.50 to 20.00
Chicago, cupola	22.00 to 23.00
Cincinnati No. 1 machinery cupola (net tons)	20.00 to 20.50
Cleveland, cupola	21.00 to 22.00
Detroit (net tons) (dealers)	18.00 to 18.50
Eastern Pennsylvania, cupola	20.00 to 21.00
New York, cupola (dealers)	17.00 to 17.50
Pittsburgh, cupola	21.50 to 22.00
San Francisco	28.00
St. Louis, railroad	20.00 to 20.50
St. Louis, agricultural	20.00 to 20.50
Valleys	21.00 to 22.00

HEAVY CAST

Boston (consumers)	19.00 to 20.00
Buffalo (breakable)	15.50 to 16.00
Cleveland	16.00 to 16.25
Detroit (automobile) (net ton)	22.50 to 23.00
Eastern Pennsylvania	18.00 to 18.50
New York (dealers)	16.50 to 17.00
Pittsburgh	19.00 to 19.50

MALLEABLE

Boston (railroad)	18.00 to 19.00
Buffalo	19.00 to 19.50
Chicago, railroad	20.50 to 21.00
Chicago, agricultural	19.50 to 20.50
Cincinnati, agricultural	15.50 to 16.00
Cincinnati, railroad	16.00 to 16.50
Cleveland, agricultural	19.50 to 20.00
Cleveland, railroad	20.00 to 20.50
Detroit (dealers)	17.00 to 17.50
Eastern Pennsylvania, railroad	17.00 to 18.00
Pittsburgh, railroad	20.00 to 20.50
St. Louis, agricultural	18.00 to 18.50
St. Louis, railroad	18.50 to 19.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	15.00 to 15.50
Boston (dealers)	13.00 to 14.00
Chicago	18.00 to 18.50
Cleveland	17.50 to 18.00
Detroit	14.50 to 15.00
Eastern Pennsylvania	18.50 to 19.50
New York (dealers)	14.00 to 14.50
Pittsburgh district	20.50 to 21.00
St. Louis	19.50 to 20.00

LOCOMOTIVE TIRES

Chicago	18.25 to 19.25
St. Louis	18.00 to 18.50

LOW PHOSPHORUS PUNCHINGS

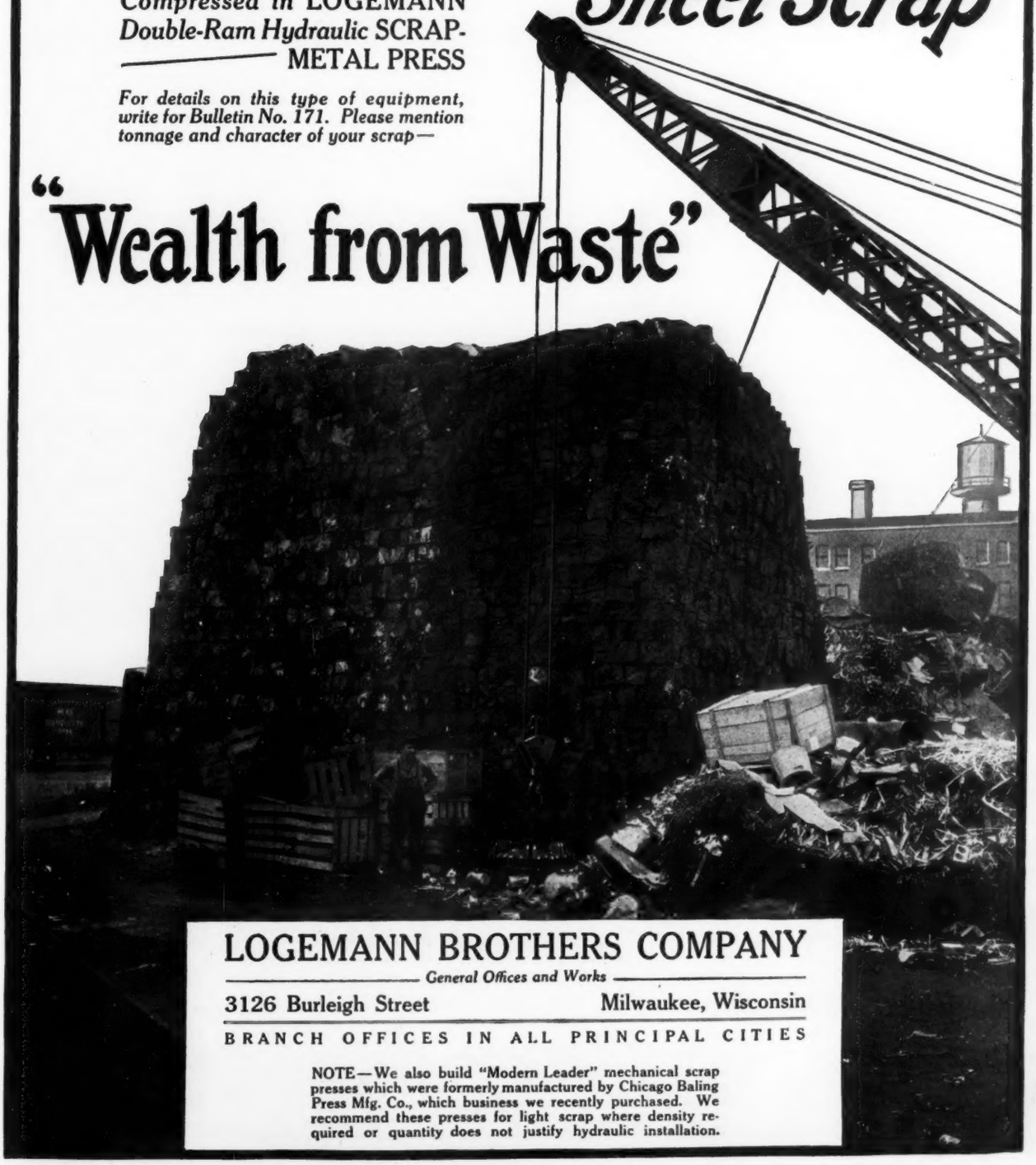
Chicago	18.00 to 18.50
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh	21.50 to 22.00

Almost 2000 Tons - of "LOGEMANN HYDRAULIC-COMPRESSED" Sheet Scrap

Compressed in LOGEMANN *Double-Ram Hydraulic* SCRAP-METAL PRESS

For details on this type of equipment, write for Bulletin No. 171. Please mention tonnage and character of your scrap—

"Wealth from Waste"



LOGEMANN BROTHERS COMPANY

General Offices and Works

3126 Burleigh Street Milwaukee, Wisconsin

BRANCH OFFICES IN ALL PRINCIPAL CITIES

NOTE—We also build "Modern Leader" mechanical scrap presses which were formerly manufactured by Chicago Baling Press Mfg. Co., which business we recently purchased. We recommend these presses for light scrap where density required or quantity does not justify hydraulic installation.

PAGINATION

INCORRECT

"Where-To-Buy"

A classified-by-products list of advertisers for the convenience of readers. If you don't find what you want, write us and we will tell you where to get it. ¶Index to advertisements will give you page number of any advertiser and by referring to advertisement you can get full particulars about products.

ABRASIVES (Metallic)
Globe Steel Abrasive Co., The, Mansfield, O.

ACCUMULATORS
Birdsboro Steel Fdy. & Mach. Co., Birdsboro, Pa.
Chambersburg Engineering Co., Chambersburg, Pa.
Logemann Brothers Co., 3120 Burleigh Ave., Milwaukee, Wis.
Southwark Foundry & Machine Co., 4th St. and Washington Ave., Philadelphia, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.

ACETYLENE (Dissolved)
Prest-O-Lite Co., Inc., The, Indianapolis, Ind.

ACETYLENE GENERATORS
Air Reduction Sales Co., 342 Madison Ave., New York City.
Oxweld Acetylene Co., Newark, N. J.

ACETYLENE IN CYLINDERS
Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.

ADAMITE ROLLS
American Adamite Co., The, 311 Oliver Bldg. Pittsburgh, Pa.

ADDRESSERS (Metal Shipping Tags)
Pannier Bros. Stamp Co., 207-209 Sandusky St., Pittsburgh, Pa.

AGITATORS
Chapman Engineering Co., Mt. Vernon, O.
Cooper, C. & G., Co., Mt. Vernon, Ohio.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS
Browne, deCourcy, Inc., 120 Broadway, New York, N. Y.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York, N. Y.
Hickman, Williams & Co., First Nat'l Bank Bldg., Cincinnati, O.
Interstate Iron & Steel Co., 104 So. Michigan Ave., Chicago, Ill.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Metal & Thermit Corp., 120 Broadway, New York, N. Y.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Tutein, E. Arthur, 200 Devonshire Street, Boston, Mass.
Vanadium Corp. of America, 120 Broadway, New York.
Victory White Metal Co., 2081 W. 55th St., Cleveland, O.
Waldo, Egbert & McClain, 708 Marine Trust Bldg., Buffalo, N. Y.

ALUMINUM
Leavitt, C. W. & Co., 30 Church St., New York, N. Y.
Rogers, Brown & Co., Room 1942-30 Church St., New York.

ALUMINUM (Vanadium)
Vanadium Corp. of America, 120 Broadway, New York.

ANALYTICAL CHEMIST
Louis G. Robinson, 31 E. 4th St., Cincinnati, O.

ANGLES, TEES, CHANNELS—See STEEL (Structural)

ANNEALING BOXES
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Calorizing Co., The, Oliver Bldg., Pittsburgh, Pa.
National Wrought Iron Annealing Box Co., Washington, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Wilfong, Millard F., Iron Works Co., Philadelphia, Pa.
Zanesville Malleable Co., Zanesville, Ohio.

ANNEALING POTS
Urick Foundry Co., 15th and Cherry Sts., Erie, Pa.

ANTI GLARE PREPARATION
Skybryte Co., The, Keith Bldg., Cleveland, Ohio.

ARCHITECTS (Industrial)
Ferguson, H. K., Co., The, 6523 Euclid Ave., Cleveland, O.

ARMATURES
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

ARMOR FOR CONCRETE FLOORS
Irving Iron Works, Long Island City, N. Y.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. La Salle St., Chicago, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Lockart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pollak Steel Co., Cincinnati, O.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

BALING PRESSES
Logemann Brothers Co., 3120 Burleigh Ave., Milwaukee, Wis.

BALLS (Brass and Bronze)
Ellsworth Haring, 114 Liberty St., New York, N. Y.

BALLS (Steel)
Ellsworth Haring, 114 Liberty St., New York, N. Y.

BANDS AND HOOPS (Galvanized Strips)
Sharon Steel Hoop Co., Sharon, Pa.

BANDS (Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Lockart Iron & Steel Co., Pittsburgh, Pa.
Larkin, J. K., & Co., Inc., 253 Broadway, New York, N. Y.

BANDS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Larkin, J. K., & Co., Inc., 253 Broadway, New York, N. Y.
Pollak Steel Co., The, Cincinnati, Ohio.
Soule, Edw. L., Co., Rialto Bldg., San Francisco, Cal.
Valley Rolling Mills, Inc., 120 Broadway, New York, N. Y.

BAND SAWS (Metal Cutting)
Huther Bros. Saw Mfg. Co., 1190 University Ave., Rochester, N. Y.

BAR BENDERS
Kardong Bros., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., 71 Broadway, New York, N. Y.

BARRELS (Steel)
Cleveland Wire Spring Co., The, 1281 E. 38th St., Cleveland, O.

BARS (Alloy)
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

BARS (Angle)
Hyman-Michaels Co., 122 Peoples Gas Bldg., Chicago, Ill.

BARS (Concrete Reinforcements)
Bethlehem Steel Co., Bethlehem, Pa.
Bourne-Fuller Company, Hanna Bldg., Cleveland, Ohio.
Casse, Joseph, San Francisco, Cal.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Franklin Steel Works, Franklin, Pa.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.
Gunn, Carle, & Co., 444 Market St., San Francisco, Cal.
Judson Mfg. Co., 819 Folsom St., San Francisco, Cal.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Larkin, J. K., & Co., Inc., 253 Broadway, New York City.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Pardee Steel Corp., Perth Amboy, N. J.
Pollak Steel Co., The, Cincinnati, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Soule, Edw. L., Co., Rialto Bldg., San Francisco, Cal.
Sweet's Steel Co., Williamsport, Pa.
Truscon Steel Co., 615 Wayne St., Detroit, Mich.
Wetenhall, W. S., Co., 17th and Wisconsin Sts., San Francisco, Cal.

BARS (Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Key, John L., Inc., 74 N. Montgomery, San Francisco, Cal.
Larkin, J. K., & Co., Inc., 253 Broadway, New York City.
Lockart Iron & Steel Co., Pittsburgh, Pa.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Ohio Falls Iron Co., New Albany, Ind.
Pardee Steel Corp., Perth Amboy, N. J.
Penn Iron & Steel Co., Creighton, Pa.

BARS (Steel)
Beck & Corbitt Iron Co., 1230 N. Main St., St. Louis, Mo.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Bourne-Fuller Co., Hanna Bldg., Cleveland, O.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Casse, Joseph, San Francisco, Cal.
Central Steel Co., Massillon, Ohio.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Ducommun Corp., P. O. Box 310, Arcade Station, Los Angeles, Cal.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Warehouse Co., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Judson Mfg. Co., 819 Folsom St., San Francisco, Cal.
Keys, John L., Inc., 74 N. Montgomery, San Francisco, Cal.
Larkin, J. K., & Co., Inc., 253 Broadway, New York City.
Morris, Wheeler & Co., 30th and Locust Sts., Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Pardee Steel Corp., Perth Amboy, N. J.
Pollak Steel Co., The, Cincinnati, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Soule, Edw. L., Co., Rialto Bldg., San Francisco, Cal.
Tennessee Coal, Iron & Railroad Co.,

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above